GEOGRAPHY OF THE BLUE GRASS REGION

DARRELL HAUG DAVIS

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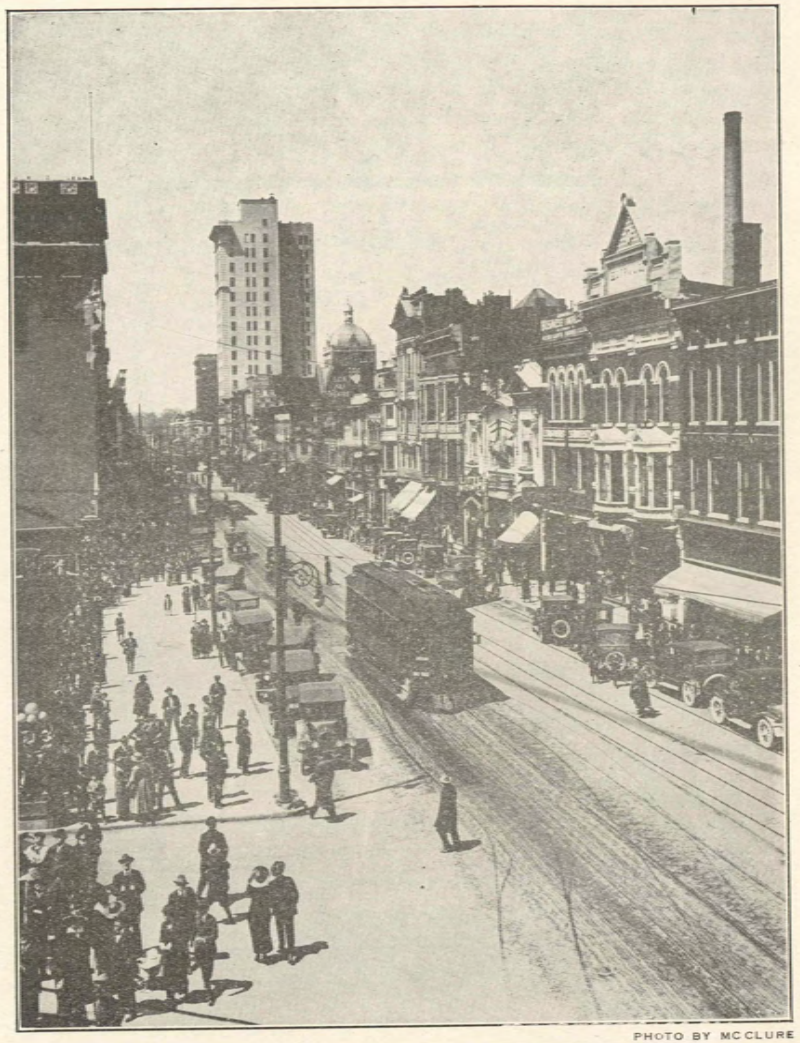

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MAIN STREET, LEXINGTON, FAYETTE COUNTY

This view of the principal business street of Lexington shows a typical portion of the business section with the Fayette National Bank Building in the background at the right.

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THE GEOGRAPHY *of the* BLUE GRASS REGION *of* KENTUCKY

A Reconnaissance Study of the Distribution and Activities of Man in the Area of Ordovician Outcrop Embraced by the Commonwealth.

BY

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THE KENTUCKY GEOLOGICAL SURVEY

FRANKFORT, KENTUCKY

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Preface

This study of the Blue Grass region of Kentucky has for its objectives the description and explanation of the present distribution of population and the economy of the area; the subdivision of the entire region into smaller units of essentially uniform physical equipment and unity of response; and the indication of opportunities for improvement of existing conditions and advantageous future development.

The subject is treated in two parts. In Part One, which is largely introductory in character, the area is defined and its physical equipment is described in general terms. In addition, a brief historical background is introduced, as some present day activities are survivals and without adequate explanation in present conditions. This is followed by a division of the entire area into sub-regions of greater geographic unity. The object of the first portion of this section is to portray the characteristics of the environment in order to establish the grounds for a subdivision of the area based on variation in response resulting from differences in physical equipment. In this section, individual environmental factors are treated only in their phases which are of significance in setting the Blue Grass apart from surrounding areas or in determining differences in human response in the various sub-regions.

Part Two is a survey of present economic conditions, together with an explanation of economic adjustments, based in major portion upon regional opportunity and handicap. Non-geographic factors have been taken into account, however, wherever necessary for the satisfactory explanation of existing conditions.

In Part Two, the use of the land, conditions of life in the rural and urban centers, highways and transportation, scenic assets, mineral resources, and urban development are discussed. An analysis is made of the changes in number, distribution, and character of the population for several decades and the significance of such changes. The distribution and increase of wealth are also given consideration.

In the explanation of present economic conditions, the various environmental factors such as climate, soils and topography are taken into account, though no formal discussion of each on its own account is attempted. The limiting factor in the discussion of any element of the environment has been the extent to which the given factor is determinative in explaining population distribution and human activity in the area.

Contrasts between the sub-regions are drawn in this section. The lack of coincidence of political boundaries with those of the geographic sub-regions has necessitated the selection of political subdivisions within sub-regions to serve as type areas to illustrate conditions in the sub-regions. This has been made necessary by the manner in which statistical material is tabulated in census reports. Exact, quantitative comparisons between the total areas of the sub-regions are, therefore, impossible to make, though the data available are satisfactory for the establishment of comparative differences in the desirability of the different portions of the Blue Grass.

The study of the present economy of the area and its basis points the way for a summary of the problems of the Blue Grass and the statement of some possible solutions for these problems. Both the assets and the handicaps are evaluated and present trends are taken into account in determining the probable future.

Fortunately, the Blue Grass is rather definitely delimited and its boundaries are easily determined. In the surrounding Knobs area, lesser opportunity has led to distinctly different living conditions, apparent to even the casual observer. The Blue Grass, the "Heart of Kentucky," with its distinguished past performance and long and significant historical background, has appropriately been left for one of the last of the regional geographic studies sponsored by the Kentucky Geological Survey.

The field work was done during the summer of 1923. Previous field experience in other portions of the state, together with the good roads in many portions of the Blue Grass, facilitated the task of securing the necessary information upon which to base this report. In addition, the prosecution of the work was greatly aided by the helpful cooperation of many individuals whom it is impracticable to name separately. The writer, however, wishes to express his obligation to all who were of assistance, particularly to the officers of the various Chambers of Commerce and the Co-operative Marketing Associations. Special acknowledgment should also be accorded to Dr. W. R. Jillson, Director and State Geologist, for the interest which he has manifested in the initiation, and the support which he has extended in the prosecution of this and other geographic studies in the State of Kentucky.

D. H. Davis,
Geographer.

April 1, 1925.
Minneapolis, Minnesota.

The Geography *of the* Blue Grass Region of Kentucky

PART I.

SPACE RELATIONSHIPS, HISTORICAL BACKGROUND, PHYSICAL CHARACTERISTICS, AND SUBDIVISIONS OF THE BLUE GRASS REGION OF KENTUCKY.

CHAPTER I.

INTRODUCTION

"The Blue Grass of Kentucky"

In the roughly circular area of rolling upland of north central Kentucky bounded on the east, south, and west by the semi-circular belt of the Knobs, and on the north by the Ohio River, the soils, which have resulted in larger part from the disintegration of limestones of high phosphorous content, are especially adapted to the growth of bluegrass, (Poa pratensis), hence the name by which the region is commonly known. This area of high class soils, the earliest settled portion of Kentucky, was one of the first regions west of the Appalachians to be brought into agricultural use. For many years, the Blue Grass, which has dominated the state both economically and politically, has been known, appropriately enough, as the "Heart of Kentucky."

Space Relations

The Blue Grass embraces an area of approximately 8,000 square miles. (1)* The roughly circular outline is a result of geological structure and the work of the agents which have been effective in producing existing soil and topographic conditions.

The Blue Grass of Kentucky

The boundaries of the Blue Grass do not coincide with those of political units and are rather irregular in detail, being most complicated where removal of the younger, overlying formations has been least complete. This complexity is partially shown in Figs. 1 and 2. In some places, as in the Jeptha Knobs Area of Shelby County, portions of the Silurian strata still remain as islands in the Blue Grass proper, completely surrounded by the older formations. In other localities, erosion has removed only a small fraction of the overlying, younger formations and peninsulas of the Blue Grass project from the main mass of the area, as in northern Casey County.

*Numbers in parenthesis refer to the bibliography at the end of the chapter.

On the southern, southeastern, and southwestern margins, the boundary is comparatively easy to trace. From the gently rolling Blue Grass, the encircling "Highland Rim" or the "Knobs" area can be seen from a distance of miles. See Pl. XII). To the east and west, the complexity of the boundary increases and the location of a definite line of division without detailed study becomes more difficult. On the north, the Blue Grass drops off abruptly to the alluvial bottom land which border the Ohio River, the northern boundary of the state. In its larger outlines, the line of division between the Blue Grass and surrounding areas is sharp and can be determined on the basis of change in economic conditions, without any reference to geological structure, although geological formations also change along the same lines which separate areas of contrasted living conditions.

Like most other portions of Kentucky, the Blue Grass was never surveyed into sections, hence each possessor of a land warrant located his land where he wished and surveyed it at his own cost. Unskillful early surveyors naturally made many errors, thus greatly confusing land titles. In addition, the absence of a general survey by the State or the United States led to an irregular farm pattern and oddly shaped counties with main roads tending to converge upon a centrally located county seat. In many cases, however, roads were in existence prior to the formation of the present counties, so that the focus of the principal roads of a given county may today be an urban center located outside the county. This absence of a rectangular pattern for farms and roads, in an area where for the most part topographic conditions do not compel an irregular pattern, constitutes a minor handicap for the area.

Settlement and County Organization

The Blue Grass is the center upon which the life of the state has focused since the period of earliest settlement west of the Appalachians. Even today, in spite of the changing economic emphasis and the decreasing relative importance of the area, the Blue Grass is, in fact as well as in popular fancy, the "Heart of Kentucky."

Early access to the area was difficult, but the combined attractiveness of genial climate and fertile soils led thousands,

as early as the latter portion of the eighteenth century, to brave the difficult passage of the dissected highland areas to the east and the danger of Indian attack to take advantage of the opportunities afforded by this garden spot of North America. Passing by areas of less attractiveness to the east, the early settlers pushed on until they reached the Blue Grass Region. This migration is one of the great movements of population in the history of the United States, perhaps in some respects the greatest when the date of occurrence, the motives for the movement, and the difficulties and many dangers of the journey are considered, for although not occupied by permanent Indian settlements, the forests and cane thickets of central Kentucky formed a vast hunting ground for many hostile Indian tribes who resented white intrusion into the area.

The earliest movement of population into the Blue Grass was by overland routes, the most important of these being the "Wilderness Road," by way of Cumberland Gap and the break in Pine Mountain where the Cumberland River cuts through at Pineville, thence to Crab Orchard in Lincoln County, and from that point, to the various portions of the Blue Grass. Though difficult, this route was more popular than the shorter but rougher overland routes (2) and it was also less exposed to danger of Indian attack than the northern roads or the route down the Ohio River. (3)

From 1774, the date of the settlement of Harrodsburg, the increase of population was rapid. By 1784, the date of the erection of the block house where Maysville now stands, the major movement of population into the area was by way of the Ohio River to Maysville and thence overland to the interior. (4)

The early attractiveness of the area is evidenced by the rapidity with which it was occupied despite the danger of Indian attack and the difficulty of travel, both overland and by river. By 1792, the date of admission of Kentucky to statehood, upwards of 125 settlements or stations had been established within the confines of the various Blue Grass counties. (5) Many of these stations have disappeared; others represent existing urban centers of present significance. The accompanying tabulation gives the dates of settlement of those stations which

have persisted until the present as relatively important urban aggregations.

STATIONS ESTABLISHED BETWEEN 1774 AND 1792 WHICH HAVE PERSITED AS RELATIVELY IMPORTANT URBAN CENTERS

Dates	Names of Present Urban Centers
1774	Harrodsburg (Mercer Co.)
1776	Georgetown (Scott Co.)
1778	Richmond (Madison Co.)
1779	Lexington (Fayette Co.)
1781	Danville (Boyle Co.)
1784	Maysville (Mason Co.)
1789	Paris (Bourbon Co.)
1792	Williamstown (Grant Co.)

Data from Collins, Richard H.: History of Kentucky, Vol. 2, pp. 17-24. Connelley, W. E., and Coulter, E. W.: History of Kentucky, Vol. 1, pp. 200-210.

The census of 1790 returned but five Kentucky towns, all in the Blue Grass or on its margins. Of these, Lexington with a population of 834, headed the list. In the 1800 census, twenty-nine towns were enumerated separately. Of these, two thirds were Blue Grass settlements, with Lexington again heading the list with a population of 1,795, nearly three times that of the second city in size which was Frankfort.

On December 6, 1776, Kentucky County was established by Virginia; (6) (7) by November 1, 1780, the counties of Jefferson, Lincoln and Fayette had been formed by the subdivision of Kentucky County. From portions of these counties, the present Blue Grass counties have originated by the process of subdivision. The order and dates of formation, the counties from which formed, the area of the present counties and the rank in size in the state are shown in the accompanying tabulation.

ORIGIN OF BLUE GRASS COUNTIES

Order of Formation of Counties	Names of Counties	Date of Formation	Counties from Which Formed	Area of Present County in Sq. Mi.	Rank in Size in State
2	Fayette	1780	Kentucky	269	79
5	Bourbon	1785	Fayette	304	65
6	Mercer	1785	Lincoln	253	86
7	Madison	1785	Lincoln	446	21
8	Mason	1788	Bourbon	227	94
9	Woodford	1788	Fayette	195	106
10	Washington	1792	Nelson	299	70
11	Scott	1792	Woodford	289	71
12	Shelby	1792	Jefferson	427	27
14	Clark	1792	Fayette-Bourbon	265	81
17	Harrison	1793	Bourbon-Scott	311	61
18	Franklin	1794	Woodford-Mercer-Shelby	199	103
19	Campbell	1794	Harrison-Scott-Mason	145	117
22	Montgomery	1796	Clark	198	105
23	Bracken	1796	Mason-Campbell	204	99
25	Garrard	1796	Mercer-Lincoln-Madison	237	90
28	Pendleton	1798	Bracken-Campbell	279	73
30	Boone	1798	Campbell	251	88
31	Henry	1798	Shelby	303	66
33	Gallatin	1798	Franklin-Shelby	109	119
36	Jessamine	1798	Fayette	172	113
42	Nicholas	1799	Bourbon-Mason	208	98
62	Owen	1819	Scott-Franklin-Gallatin	367	45
67	Grant	1820	Pendleton	264	82
77	Spencer	1824	Nelson-Shelby-Bullitt	186	110
82	Anderson	1827	Franklin-Mercer-Washington	201	101
87	Carroll	1838	Gallatin	132	118
90	Kenton	1840	Campbell	163	114
94	Boyle	1842	Mercer-Lincoln	186	109
111	Robertson	1867	Nicholas-Harrison-Bracken-Mason	109	120

Average size of Kentucky counties = 334.8 sq. mi.
Average size of Michigan counties = 691.3 sq. mi.
Average size of counties in the Blue Grass = 236.6 sq. mi.
Data as to order and dates of formation and counties from which formed from:
Collins, Richard H. History of Kentucky, Vol. 2, p. 26.
Data as to area of present counties and their relative rank in size in the state from:
Fourteenth Census of the U. S., Bulletin on Agriculture, Kentucky.

By continued and excessive subdivision the Blue Grass counties have been greatly reduced in size, much below the state average in a state characterized by too small counties. Of the fifty smallest counties in the entire state, twenty-three are in the Blue Grass, on the basis of but thirty counties in the Blue Grass. Of these thirty Blue Grass counties, only three have an area in excess of the state average. Robertson County, the smallest Blue Grass county and the smallest in the state, has an area of only 109 square miles.

This unnecessary and undesirable subdivision and the location of county boundaries have apparently little or no necessary basis in the physical environment. Some of the smaller counties, as Jessamine County, are gently rolling in topography; others, as Robertson County, are hilly; still others, as Anderson County, contain both rolling upland and hill land. Climatic and other marked differences, aside from topography and soils, are lacking. In some cases, the poorer, hilly counties are large; in other cases, they are small. The same variation in size is also noted for the wealthier counties of more rolling topography. Not only are the present boundary lines between counties in many cases illogical, but the size of all counties is also too small for economical and effective administration of public affairs.

Such small counties as those of the Blue Grass lead to an unnecessary multiplication of office holders and an increased burden of taxation. The danger of further subdivision of existing counties is probably not imminent. The subdivision of many of the larger counties of pioneer days was necessary and desirable, but with present conditions, density of population, and distribution of wealth, there is no economic justification for such counties as Robertson and others of comparable size. A readjustment of county lines and an increase in the size and decrease in the number of counties should lead to an increase in the efficiency and a decrease in the expense of the administration of county affairs.

Physical Features

The character of the rocks exposed in the various portions of the Blue Grass is determined by the relation these different areas bear to the Cincinnati Anticline, a broad low arch extend-

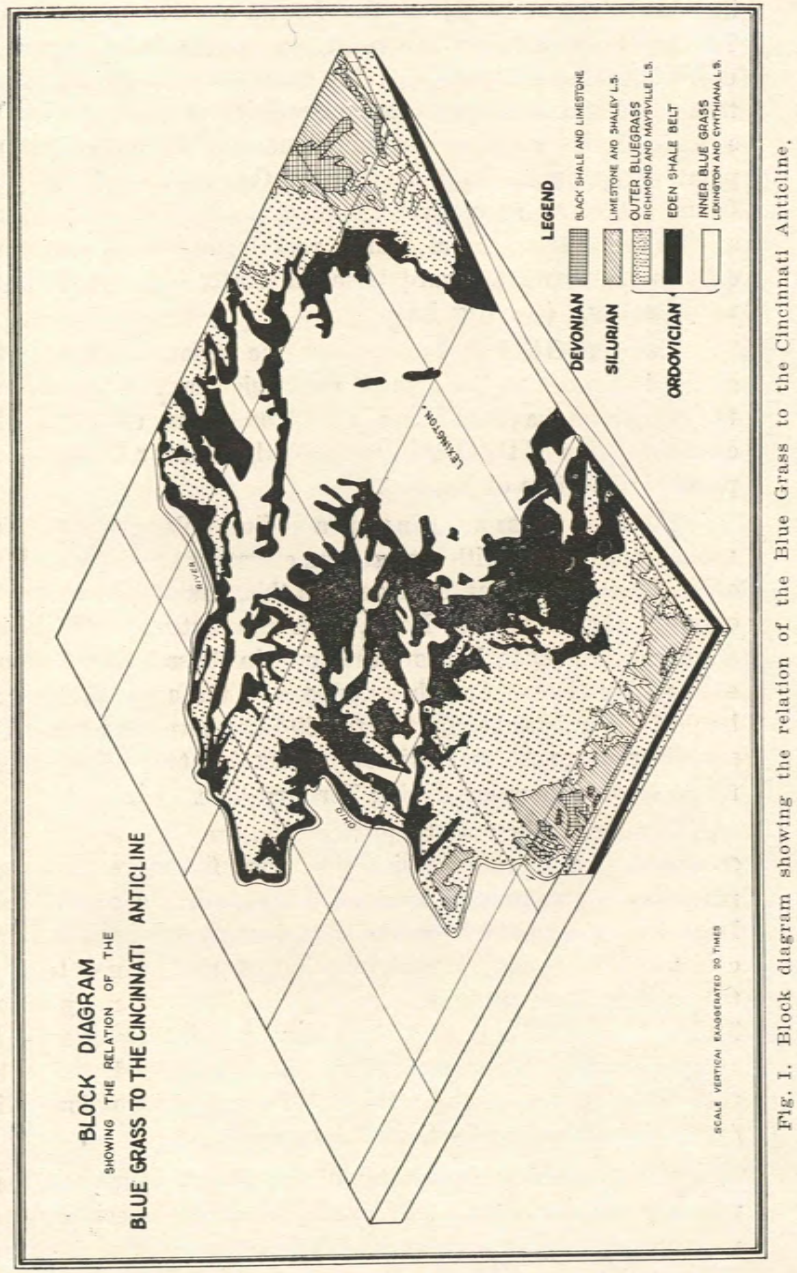

Fig. 1. Block diagram showing the relation of the Blue Grass to the Cincinnati Anticline.

ing north and south across the central portion of the state. Though the rock layers dip gently on the flanks of this arch, erosion has nearly completed the truncation of the dome, so that the oldest strata are now exposed at or near the former summit of the dome in Jessamine County. From this central point of maximum elevation toward the margin of the Blue Grass, therefore, successively younger formations are exposed so that concentric belts of similar rock formations are encountered as one travels outward from the central portion in Jessamine County. (See Fig. I.)

The Blue Grass proper, which is the region covered by this study, is limited to the area of Ordivician outcrop at or near the summit of the dome. These strata, occupying as they do the central portion of the dome, represent the oldest rock layers exposed in the State of Kentucky.

The Blue Grass as defined is a rolling upland of somewhat varied topography, with a maximum elevation above sea level of about 1,050 feet. Elevations such as this, however, are attained only on the Jessamine Dome, although outliers of Silurian strata may rise slightly above this level in the marginal portions of the Blue Grass. In other portions of the area, the general level of the upland is only 800 to 900 feet above sea level. It is sometimes assumed that this approximation to a plane is the result of peneplanation during Tertiary time. (8)

Comparatively recent uplift of the area has undoubtedly occurred, as a result of which the rivers flow through gorges much below the general level of the upland. (See Pl. XL.) High level river gravels on the shoulders of such gorges afford evidence that rivers formerly flowing at the general level of the country have sunk their courses to their present position. Miller, however, holds that the coarseness of these gravels by comparison with the fineness of the silt now being deposited by these same streams argues against a former plain of low relief across which the streams flowed sluggishly. (9)

A very striking feature of all the stream courses is their winding character, commonly explained as an inherited set of meanders holding over from the peneplain condition. Again, as Miller points out, (10) the slope of the land from the upland

to the river, and especially the presence of deserted meanders essentially at present stream levels, as in the vicinity of Frankfort, tends to discredit the theory that these are inherited meanders and to lend plausibility to the explanation that the meanders developed as the rivers cut down their beds to the present levels.

It is probable that the past geological history of the area has also been responsible for some important changes in the courses of the upper portions of the major drainage lines. For example, faulting has probably diverted what was in the past the upper portion of the Licking drainage into the Kentucky River, converting the Dix River, which was formerly the main stream, into a tributary of the Kentucky.

Two large river systems cross the Blue Grass, the Kentucky and the Licking. In addition, many tributaries of the Salt River rise in the western portion, and a number of smaller streams flow directly into the Ohio River or are tributary to streams, the major portions of whose drainage basins lie outside the Blue Grass proper. Inasmuch as all of these streams flow below the level of the upland, and in the case of the larger rivers the gorges are of considerable depth, belts of hilly country border the streams, greatly decreasing the desirability of the country marginal to the larger rivers. (See Fig. 3.)

Although the major topographic features constitute an inheritance from the time when the area was in the peneplain stage, minor topographic variations in the Blue Grass are largely the result of differences in the resistance of the various rock formations which have been exposed by the truncation of the broad uplift known as the Cincinnati Anticline.

The entire Blue Grass area is underlain by Ordivician strata, but these vary greatly in character so that there is a concentric, belted arrangement of rocks and overlying soils from the oldest formations of the Jessamine Dome outward. (See Fig. I.) These subordinate areas within the Blue Grass, named from within outward are: (1) The Lexington-Cynthiana Limestone Area, (2) The Eden Shale Belt, (3) The Maysville-Richmond Limestone Belt. Within each of these individual areas, rock formations are of sufficient similarity so that topographic conditions are essentially uniform.

In the innermost of these subdivisions, underlain by the highly phosphatic Lexington and Cynthiana limestones, the topography is gently rolling in character except along the borders of the larger rivers, where dissection has produced a hilly country. Drainage is in large part underground, particularly in the Lexington limestone area, and the country is pitted with small sinks. (See Pls. I and V.) The big springs, which are formed where an underground stream appears at the surface, determined the location of many pioneer settlements which later became county seats, this being the case for Harrodsburg, Georgetown and Lexington.

The Eden Shale Belt, which encircles the Lexington-Cynthiana Limestone Area, is very different in appearance and topography from the preceding region. Erosion has converted the area into a very rough country, much resembling in appearance the Mountains of Eastern Kentucky, except that the hills, though equally steep, are somewhat lower. Shale predominates, with thin layers of limestone and occasionally a capping layer of sandstone. The hills often terminate in sharp ridges (See Pl. IX), but where the capping layer is sandstone, the summits are more rounded. Valleys are generally narrow and V shaped, so that relatively little level land occurs where these formations appear and form the surface. (See Pl. VII and Fig. 3.)

Surrounding the Eden Shale Belt and forming the outer margin of the Blue Grass proper, is a more level country underlain by limestones of fairly high phosphorus content. These are the limestones of the Maysville and Richmond formations. This country is very similar in appearance to the Inner Blue Grass. Topographically it contrasts sharply with the hilly Knobs Area which bounds it on its outer margin. (See Fig. 3.)

In all three of the divisions described, limited amounts of alluvial land border the courses of the larger streams. In these areas, the soils are commonly good and the topography is flat, in common with alluvial deposits elsewhere.

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CHAPTER II.

SUBDIVISIONS OF THE BLUE GRASS

The economic development of the different portions of the Blue Grass is very similar in kind on account of the considerable uniformity of the physical equipment, the homogeneity of the racial stock, and the similarity of the historical background. However, soils, topography and other factors of the environment differ sufficiently or are combined with enough variation within the Blue Grass to afford appreciable differences in opportunity, which have resulted in a considerable difference in the degree and minor differences in the character of the economic development. This manifests itself in contrasted living conditions. In view of these facts, a subdivision of the area into smaller units is desirable, such a subdivision being based on those contrasts in the entire environment which have produced difference in opportunity and activity.

The accompanying illustrations, together with others to which specific reference is made, are to aid in conveying to the reader an accurate picture of those differences in the physical equipment and the contrasted living conditions which have served as the basis for the subdivision of the area.

The contrasts which have served as a basis for the subdivision have resulted in major part from variation in soils and topography. Other marked differences in the physical equipment of the various portions of the Blue Grass are lacking. The areal extent is neither great enough nor is the relief sufficient to cause important climatic differences. Climate, except in combination with other factors, and then in minor degree only, has but slight determinative effect upon the differences in human activities which serve as a basis for this subdivision. Mineral wealth is not abundant and is not an important factor in the economy of the area and the same is true as regards forest wealth and animal life, insofar as the activities of the present are concerned. The soils and topography, which are the result of the rock outcrop and structure and the past geological history of

the area, determine distribution of the native vegetation and constitute the major basis for the variation in performance and contrasts in regional economy.

In the central portion, commonly known as the "Inner Blue Grass," the mildly karst topography and the highly fertile soils result from the character of the underlying strata. Similarly, the ridge and valley topography, and the poorer soils of the belt of territory surrounding the Inner Blue Grass are caused by the character of the rock formations immediately underlying the surface. The gently rolling topography and good soils of the outer marginal portion of the area, commonly designated as the "Outer Blue Grass," again have their explanation in the nature of the underlying rocks. Throughout the Blue Grass, differ-

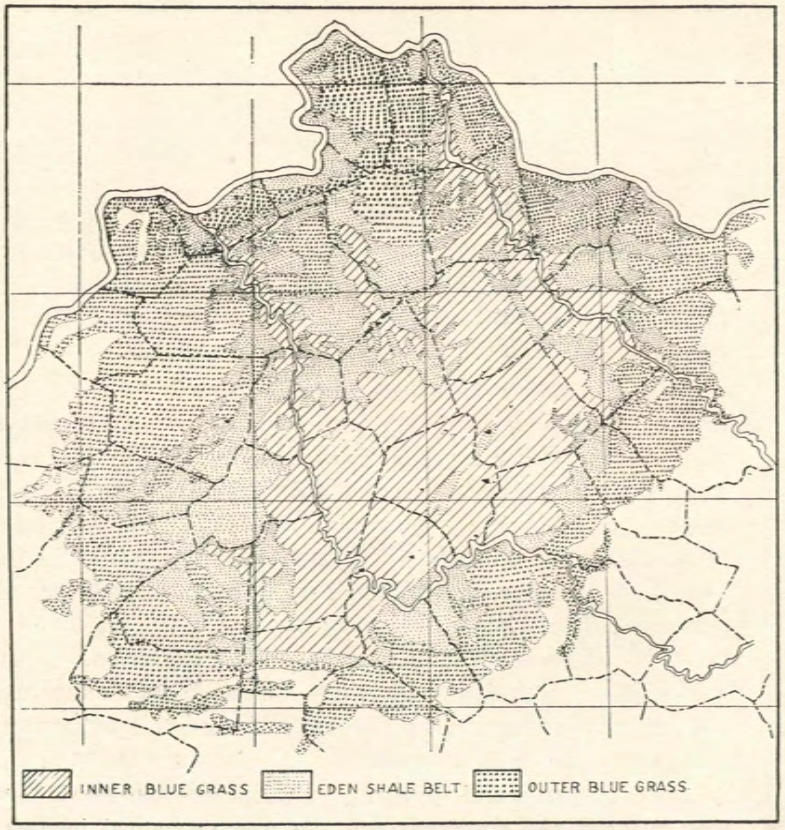

Fig. 2. Map to show the sub-regions of the Kentucky Blue Grass.

ences in the rock formations which outcrop in neighboring areas have resulted in great differences in soil character, native vegetation and topography, thereby affecting the character and degree of economic development.

It is proposed to divide the Blue Grass into three divisions of essential geographic unity as indicated by similarity of regional economy. In designating the sub-regions, the attempt has been made to select names which emphasize some characteristic of topography or location and to employ terms in common use, as such designations indicate a common acceptance of a differentiation of the area.

In the accompanying map, Fig. 2, the sub-regions are indicated and named. Boundaries are generalized to avoid undue complexity. In the areas as deliminated, however, it may be assumed that essential uniformity of opportunity and human response exists. In the descriptions of these three sub-regions in Part I, it is not the purpose to give a detailed account of the assets or occupations of each area, as these will be considered in Part II. The object of this section is to describe the outstanding characteristics which give identity to the sub-regions.

The Inner Blue Grass

This area includes about 2,400 square miles (1)* of territory or 30% of the total area of the Blue Grass. Fayette, Woodford and Jessamine counties are central to the area; portions of Anderson, Franklin, Scott, Harrison, Nicholas, Bourbon, Clark, Madison, Garrard, Boyle and Mercer counties comprise the outer margin of this sub-region. Fourteen out of the thirty Blue Grass counties lie, at least in part, in the Inner Blue Grass. Fayette, Woodford and Jessamine counties will serve as type localities for this sub-region.

This sub-region of the Blue Grass, underlain by Lexington and Cynthiana limestones, possesses a gently rolling topography, (See Pls. I and V and Fig. 3), except along the gorges of the main streams. In the portion underlain by Lexington limestone, the surface is pitted by small sinks and the drainage is

*Numbers in parenthesis refer to the bibliography at the end of the chapter.

underground to a considerable extent. (See Fig. 3 and Pls. I and V.)

Soils are normally of sufficient depth for successful agriculture and of extraordinary fertility on account of the high phos-

Plate I. Typical topography in the Inner Blue Grass. A Blue Grass pasture with scattered trees and small sink hole. Eastern Franklin County on the Georgetown Pike.

phorus content of the limestone from which they have been derived. Those derived from the Lexington limestone are chocolate colored and are generally considered to be somewhat superior to the more reddish soils which result from the decomposition of the Cynthiana limestone. Both are, however, of high fertility and land values are not in general determined by differences in the soil derivation, other factors outweighing such differences in the determination of the price of the land.

The former forest has been destroyed although small patches of woodland still remain and the pastures are often almost grove like in character. One of the most striking characteristics of this sub-region is the large number of trees standing in the pastures. (See Pls. I, V, and XXI.) Characteristic trees of the woodland embrace burr and chinquapin oak (Quercus alba and Quercus muhlenbergii), some red oak (Quercus rubra), walnut

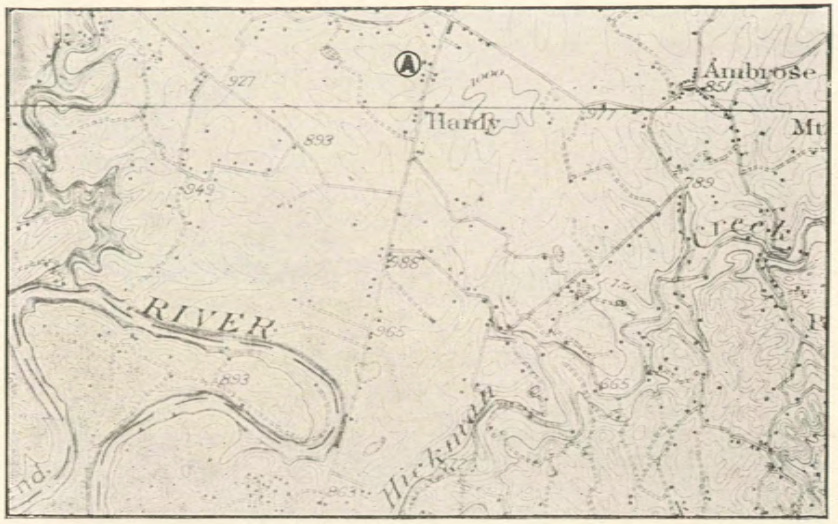

Fig. 3a. Typical topography of the Inner Blue Grass and the Eden Shale Belt.

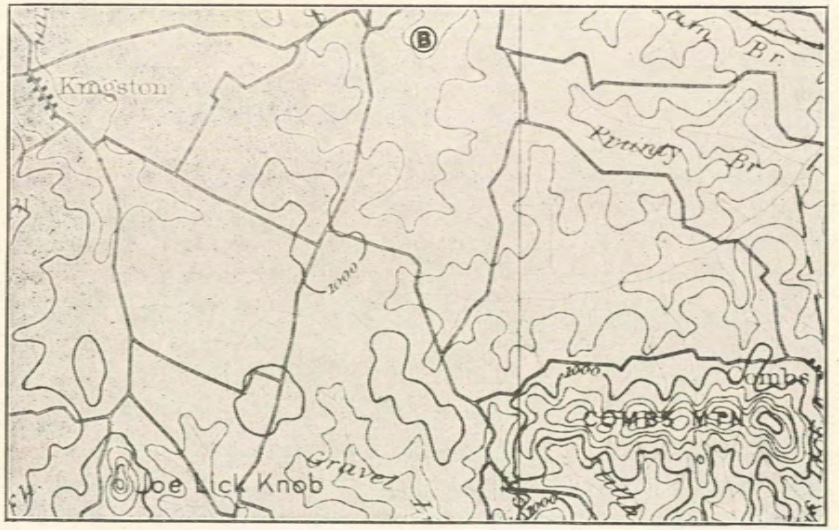

Fig. 3b. Typical topography of the Outer Blue Grass and the encircling Knobs Area.

(Juglans nigra), hackberry (Celtis crassifolia), wild cherry (Prunus serotina), and a large number of other species, among which may be mentioned various hickories, white ash, red bud, the Kentucky coffee tree, ironwood, and yellow poplar, the "State Tree." (2)

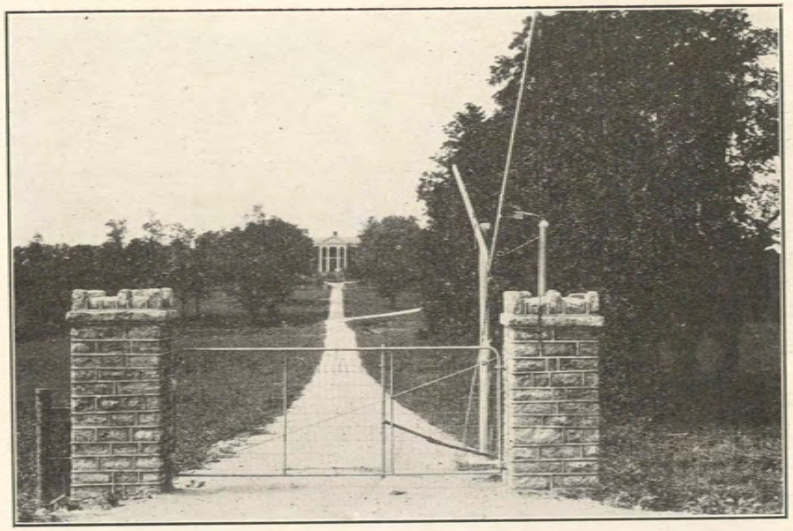

Plate II. A typical setting for the better homes of the Inner Blue Grass. The house is set well back from the highway in a large and well shaded yard. Eastern Clark County on the Winchester Pike.

This portion of the Blue Grass is the best agricultural area in the state, judged by any standards which may be applied to it. Soils are good; there is practically no waste land; a wide variety of profitable crops can be grown; crop yields are high, and living conditions are excellent. It is highly probable that this is the most attractive agricultural area in North America from the standpoint of most individuals. The desirability of the area is reflected in the high prices which the land commands.

Few of the farms are small and many embrace several hundred acres. In such cases, the owner's home is often rather pretentious and set well back from the public highway in a well shaded yard which may be several acres in extent. (See Pls. II and III.) Tenant houses and the houses of the smaller farmers in this area vary greatly in character, but they are in general substantial and fairly well kept structures.

Plate III. A Blue Grass home. Junction of Van Meter Pike and the Jackson Highway, Fayette County. Although one of the newer houses, the grounds are spacious and well shaded.

This sub-region of the Blue Grass has stock raising as one of its major activities (See Pls. XXIX, XXX, XXXI and XXXII), hence barns and outbuildings are much above the average for the state. Stock is watered at the numerous small brooks (See Pl. V), at the sink holes (See Pl. I), and at walled-in depressions in which water stands continually (See Pls. VI and XXXIV).

This area is marked off sharply from the area which surrounds it by topography, soils, and native vegetation. The superiority of the equipment of the Inner Blue Grass leads to much greater productivity, higher land values, a difference in farm holdings and the character of agricultural practice, and a very marked difference in living conditions by comparison with the surrounding area. The Inner Blue Grass is a distinct subdivision, popularly recognized as such, and commonly so designated.

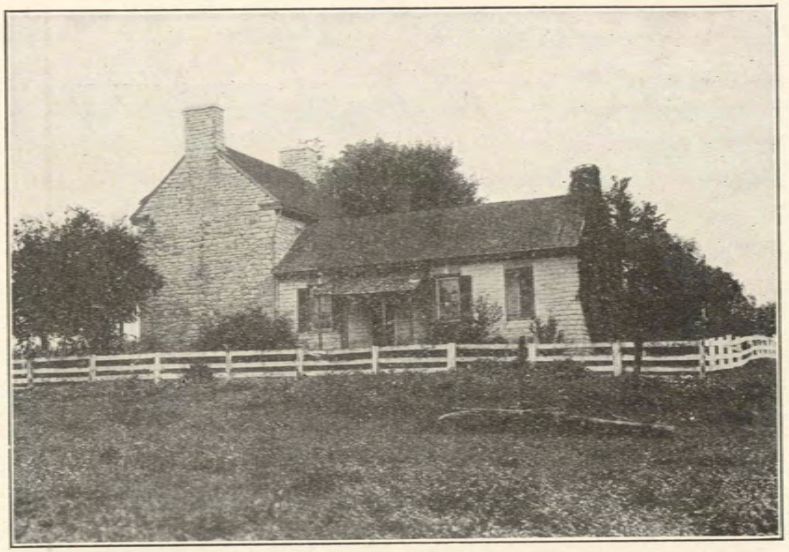

Plate IV. A substantial farm home. Constructed of local limestone. Woodford County, near Troy.

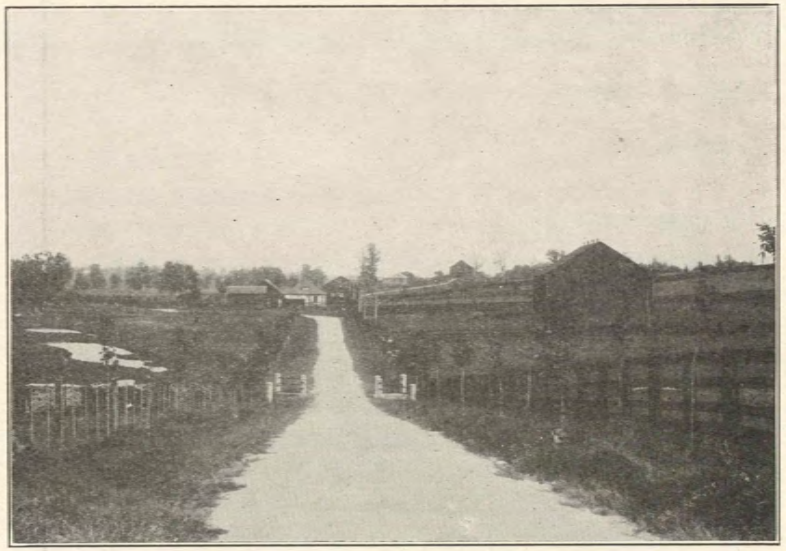

Plate V. A stock farm in Bourbon County. Creek in the foreground, tobacco barn at the right, and stock barns in the background. Typical Blue Grass topography, on the Winchester Pike, near Paris.

The Eden Shale Belt

This sub-region has an approximate area of 2,500 square miles. (3) It constitutes a belt, of variable width and very irregular margin, encircling the Inner Blue Grass. The variabil-

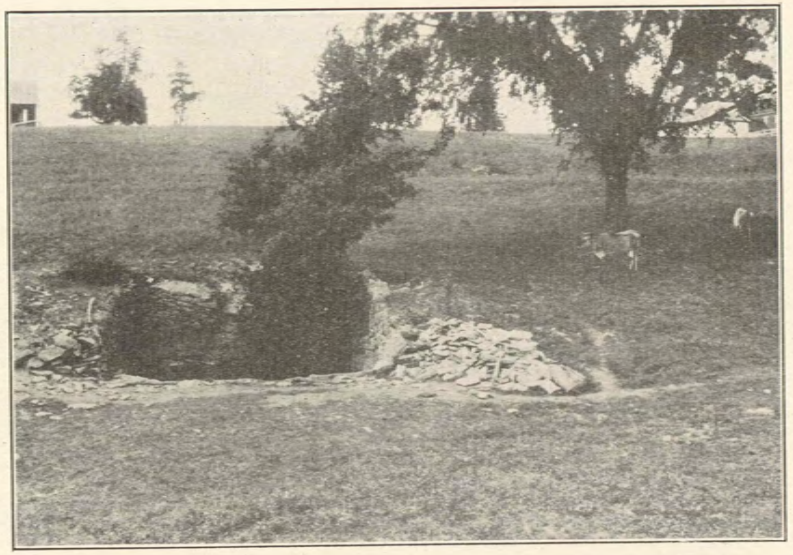

Plate VI. A characteristic scene in the Inner Blue Grass. Tobacco barn in background and walled-in watering hole in the foreground. On Maysville Pike in Nicholas County near Millersburg.

ity in the width of the belt results from differences in the dip of the strata on the various slopes of the dome. (See Figs. 1 and 2.) On the north slope, a maximum width of thirty miles is reached, but on the south slope where the dip of the strata is steeper, the belt is less than a mile wide in many places. On the eastern and western margins, the width varies from five to ten miles. Some portions of practically all of the thirty Blue Grass counties are in part in this sub-region. The major portion of the area, however, is embraced in the eastern portions of Washington, Anderson, Shelby, Pendleton, Harrison and Clark counties, the extreme eastern portions of Robertson, Nicholas and Bourbon counties, the southeastern part of Henry county, the southern portions of Owen and Grant counties, the northern part of Scott and Garrard counties, the northern and western part of Franklin county and the western portions of

Mercer, Pendleton, Harrison, Montgomery and Madison counties. In Lincoln and Boyle counties, the belt is very narrow. (See Fig. 2.) The belt reaches its greatest width in Owen, Grant, Pendleton and Harrison counties, embracing a large fraction of the area of these four counties. Owen, Grant and Pendleton counties will serve as type localities for this sub-region.

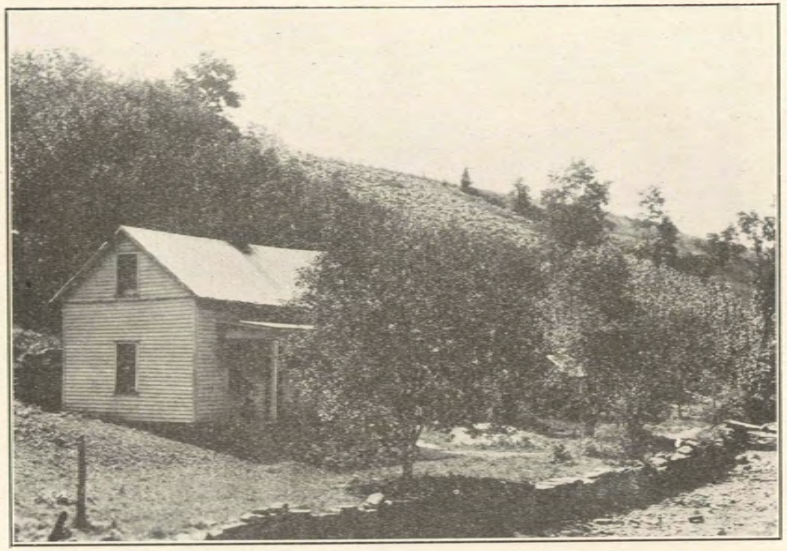

Plate VII. One of the better homes in the Eden Shale Belt. Typical Eden topography, showing the cultivation of steep slopes and house on the road which follows the creek. Taylors Fork, Madison County.

The strata underlying the surface are predominantly shales, with thin intercalated limestone layers and layers of sandstone or "siliceous mudstone." The predominance of shales has resulted in a maturely dissected topography much resembling the Mountains of Eastern Kentucky in appearance though the hills are not so high. Ridges are generally sharp and valleys are V shaped, though occasionally ridge summits are wider and more rounded where the Garrard sandstone forms the capping layer. Typical Eden topography is shown in Pls. VII, IX, X and Fig. 3.

Soils are yellowish in color and are often thin, especially on the slopes. Derived as they are from siliceous shales, they are commonly of low fertility. Under cultivation, the slopes erode badly as shown in Plates XVI and XVII, the soil being carried to the valleys, leaving thin slabs of limestone to litter the hillsides. These idle, eroded fields grow up in briers, sassafras and persimmon bushes, presenting a very unattractive, run down

Plate VIII. The valley of Eagle Creek. Typical Eden topography in the background, with one of the wider areas of alluvial soils in the foreground. Near Downingsville, Owen County.

appearance, (See Pls. XVII and XVIII) quite different in character from that of the pastures and fields of the Inner Blue Grass.

The area was originally forested and remnants still persist. In addition to these remnants, large areas are reverting to forest as the land passes out of agricultural use with abuse under cultivation. Characteristic elements of the forest growth, which differentiate this area from the Inner Blue Grass, are beech, sassafras, persimmon and hickory. Although it is probably impossible to establish any relationship between geological formations and certain widely distributed Kentucky trees, such as the black walnut (4), the species enumerated above occur characteristically here, though not in the Inner Blue Grass. On the other hand, such trees as the walnut, the oaks, cherry, red bud and others occur widely distributed in both areas.

This portion of the Blue Grass, with its poor and often thin soils, and its small amount of level land, is unpromising from the agricultural standpoint, and under unwise use, is rapidly becoming even less attractive. An occasional wider river bottom

Plate IX. Ridge road in the Eden Shale Belt. Corn and tobacco in the foreground. Pendleton county, near Falmouth.

(See Pl. VIII) holds forth some promise for the future, but by comparison with the Inner Blue Grass, it is, as a whole, a poor area agriculturally.

The farms and farm buildings in this area are located either on ridge tops or in the valleys. In some cases, where the ridges are wide and continuous, the roads follow them, winding along the crest as shown in Plate IX. In other cases, the roads follow the creeks, some of the less used roads of the narrower valleys actually being in the creek beds. (See Pls. X and XI.) Conditions in this respect are reminiscent of those in the Mountains.

The houses are not generally pretentious in character and are often dilapidated. In many instances, especially in the case of tenant houses, they are log cabin survivals of the pioneer period. Ooutbuildings are few in number, usually being limited to a tobacco barn and a few unpainted, ramshackle sheds.

The Eden Shale Belt is sharply marked off from the Inner Blue Grass by contrasted living conditions, which are the result of topographic and soil differences reflected in the appearance of a native vegetation with certain characteristic elements.

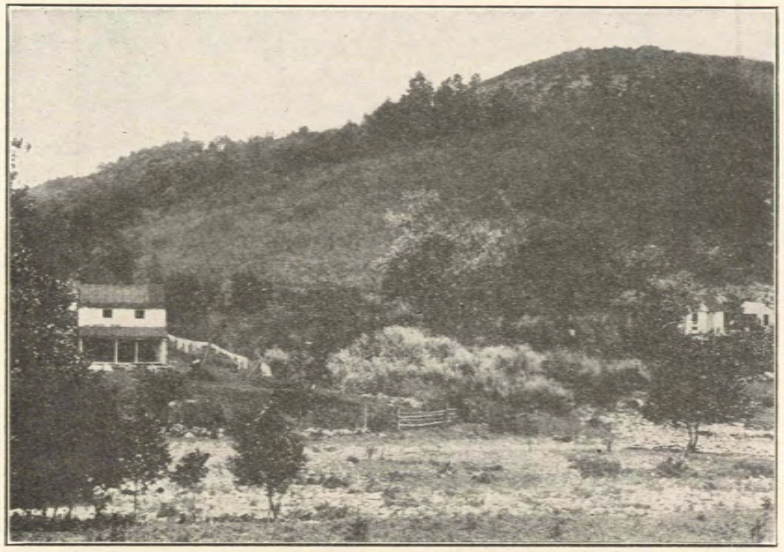

Plate X. Eden topography in Mason County near Germantown. Typical homes along the creek. which the road follows. The dry creek bed shows in the foreground.

This area is distinctly inferior in opportunity and conditions are steadily becoming worse under present agricultural practice. Ridge top and valley farms, a somewhat altered agricultural practice, and distinctly poorer living conditions all give identity to this portion of the Blue Grass.

The Outer Blue Grass

As the name of this sub-region indicates, it comprises the outer margin of the Blue Grass, encircling the Eden Shale Belt, and lying between that belt and the Knobs Area. All the marginal Blue Grass counties are represented in this area. This subregion is the greatest in areal extent of the three subdivisions, covering an extent of approximately 3,200 square miles (5) or 40 per cent of the total area of the entire Blue Grass.

As in the case of the Eden Shale Belt, the maximum width of the area is to the north and west as a result of the variation in the dip of the strata on the various flanks of the dome. On

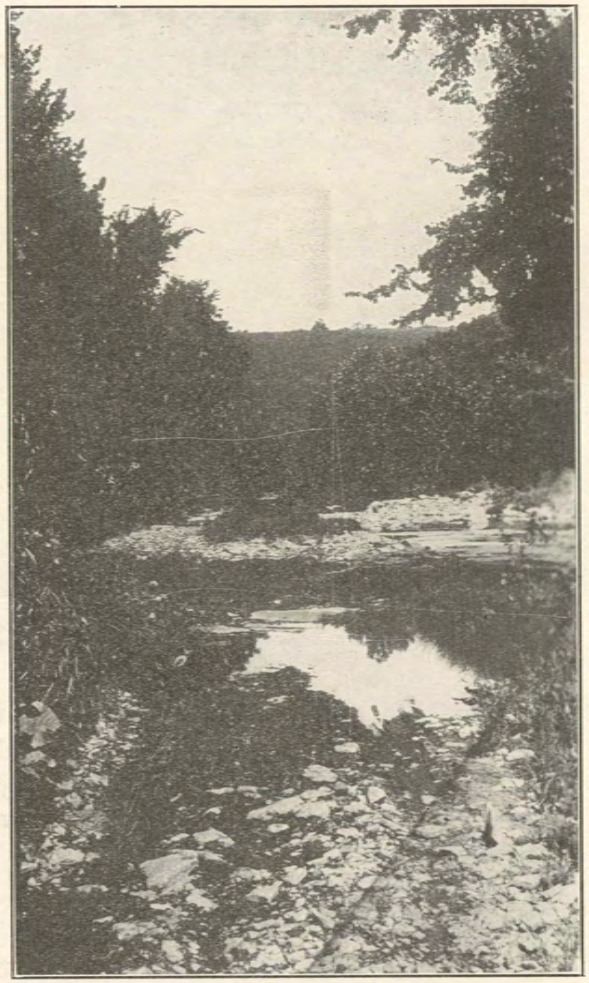

Plate XI. Road in the creek bed in the Eden Shale Belt of Madison County. Taylors Fork, near Richmond.

the southern margin, the dip is so steep that the belt becomes very narrow. (See Fig. 2.) Shelby, Henry and Madison counties, which belong in major part in this area, will serve as type localities for this sub-region.

The Outer Blue Grass is underlain by the Richmond and Maysville formations, in which limestones predominate over shales, particularly in the latter formation. In consequences of this change in the character of the underlying rock formations, the topography becomes much more level than in the Eden Shale

Plate XII. A view in the Outer Blue Grass. To the south, the hills of the Knobs show in the background. Lancaster Pike near Paint Lick, Garrard County.

Belt, and similar in appearance to that of the Inner Blue Grass. (See Pl. XII.) In many places it is possible to look across the gently rolling Outer Blue Grass and see in the distance the hills of the Knobs Area which in turn encircles the Outer Blue Grass as the Outer Blue Grass does the Eden Shale Belt. (See Pl. XII.)

Soils are in general of fair depth and in many respects resemble those of the Inner Blue Grass, inasmuch as the phosphorus content is fairly high. However, although topographic conditions are as good as in the Inner Blue Grass, and although soils are of fair fertility, the attenuation of the area together with the relatively undesirable character of both of the marginal areas, make this sub-region distinctly less desirable than the Inner Blue Grass.

The native vegetation is similar to that of the Inner Blue Grass as a result of similiarity of climatic, soil and topographic conditions. Forest remnants are not numerous and the trees so characteristic of the Inner Blue Grass are commonly lacking in pastures and cultivated fields.

Living conditions improve materially in this sub-region. Topographic conditions make cultivation of a large percentage of the area possible and soil fertility is high; crops are similar

in kind and in yield to those of the Inner Blue Grass. These conditions are reflected in the size of the farms and the character of the farm buildings. Large estates and pretentious homes reappear, as agriculture in this region is attractive. Estates, however, are fewer in number than in the Inner Blue Grass on account of the attenuation of the area, consequently there is a predominance of medium sized, prosperous farms, with modest but well kept farm buildings. Stock raising again assumes an important position in the farm economy and outbuildings correspondingly increase in number and size. Living conditions are good; roads are fair. The area is distinctly above the Eden Shale Belt in its performance, though somewhat less desirable in most of its characteristics than the Inner Blue Grass.

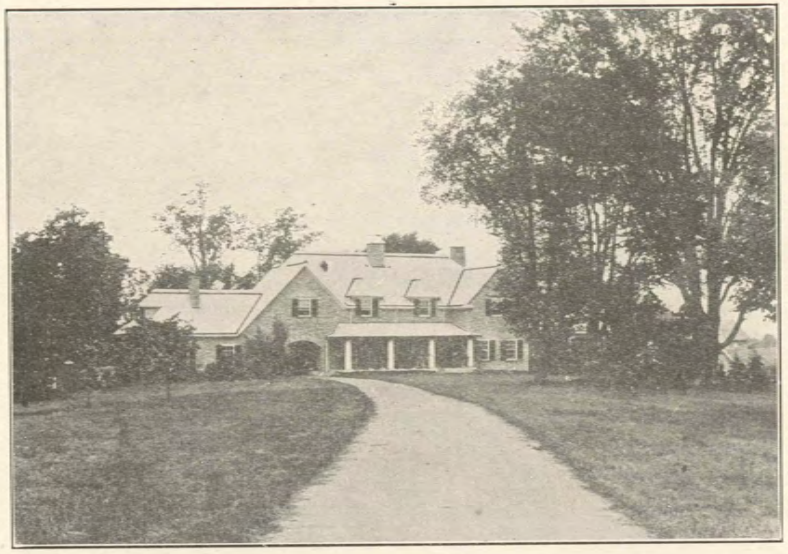

Plate XIII. One of the more pretentious homes of the Outer Blue Grass. The house is constructed of local limestone and is set well back from the highway in a large and well shaded yard. Shelby County south of Shelbyville on the Taylorsville Pike.

Bounded as this area is, on its outer margin by the Knobs, an area of extremely little promise and miserable living conditions, and on its inner margin by the Eden Shale Belt, a region of rather limited promise and of poor and increasingly poorer performance, the Outer Blue Grass possesses identity recognizable by any traveller passing through the area. The change from Eden to Outer Blue Grass to Knobs living conditions is readily apparent to even the casual observer. The average Kentuckian recognizes this differentiation in his characterization of the area as the Outer Blue Grass on account of its location and general topographic and soil resemblance to the Inner Blue Grass Area.

Plate XIV. A typical home in the Outer Blue Grass. The double porches and the well shaded yard are characteristic of many of the homes of the better portions of the Blue Grass. On the Maysville Pike, near Mays Lick, Mason County.

Silurian Islands and River Bottoms

Included within the Blue Grass are occasional islands of Silurian strata, outliers of the Knobs Area. In these areas, living conditions are much below those of the Blue Grass proper. These Silurian outliers rise above the general level of the Blue Grass and are easily recognizable at a distance. A typical home in such an area is shown in Plate XV. No attempt will be made to differentiate these from the sub-region in which they occur as they are of small areal extent and of only minor importance in determining the regional economy.

The larger rivers are bordered by alluvial deposits which are quite distinct topographically and as regards soils from the sub-region in which they are included. The limited extent of such alluvial deposits precludes their separate consideration in a geo-

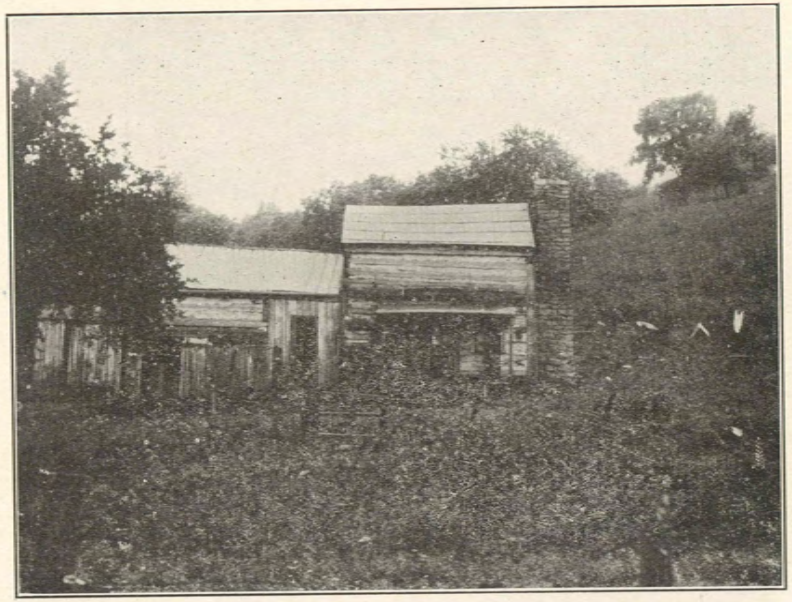

Plate XV. A typical home in an outlier of the Knobs Area. Bath County, west of Owingsville.

graphic study such as this, in which only the major areal contrasts are designed to be emphasized.

Summary

The three sub-regions of the Kentucky Blue Grass discussed in the preceding pages are sufficiently distinct in their physical equipment and the character of the economic response to warrant recognition. The differences in underlying rock formations, topography, soils and native vegetation have led to the following differences in the economic development: (1) Differences in farm size, the character of the areas in agricultural use, and the location of farms with reference to drainage lines and topographic features; (2) Differences in the percentage of the land cropped: (3) Differences in crop yields, in the character of the crops and

the importance of the animal industry; (4) Great differences in living conditions as indicted by the number, character and appearance of homes and farm buildings.

In view of these facts, the areas are and should be regarded as entitled to the separate treatment which will be accorded to them wherever it may appear that such treatment will aid in understanding present conditions in the Blue Grass or aid in solving the problems of the area.

References Chapter II

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PART II.

ECONOMIC CONDITIONS

CHAPTER III.

THE LAND AND ITS USES

Unimproved Land

Unimproved land in the Blue Grass comprises approximately 23.5% of the total area as against a state average of 44%. In no county does the percentage of unimproved land reach the state average; in only five of the thirty counties does it rise above 30%; and in Fayette County it falls to 10%. In general, the regions of gently rolling topography have a high percentage of improved land, whereas in the hilly areas, the percentage decreases.

The areas of maximum percentage of unimproved land are: (1) The regions marginal to the larger streams, where running water has carved the land surface deeply. This is particularly marked along the Ohio and Licking rivers. In Kenton County, the percentage of unimproved land rises to nearly 40%, the maximum for the entire area. Other conditions such as soils and the character of the underlying rocks are, however, in part responsible for this high percentage. (2) The Eden Shale Belt, particularly along the larger rivers, where steep slopes, poor and often thin soils make successful cultivation under the present cropping system impracticable for any extended period of time. In this area, the percentage of unimproved land rises to approximately 30%, as in Owen, Pendleton, Grant and Harrison counties, and even higher in portions of these counties bordering the major drainage lines.

Much of the unimproved land is in timber, although little of this is at present of merchantable size or quality. The unimproved lands, whether embraced in farms or not and whether timbered or destitute of forest cover, represent* (1) land on too steep slopes or with too thin soils to tempt clearing for agri-

*Numbers in parenthesis refer to the bibliography at the end of chapter.

All statistics in this chapter, unless stated otherwise, are based on the 14th Census. The war did not alter seriously the agricultural economy of the Blue Grass: therefore the figures represent essentially the normal production and economic situation.

cultural use, as along the gorges of the larger rivers; (2) a few uncleared slopes which may be added to the agricultural area, though these are limited in extent; (3) abandoned fields, especially on the steeper slopes, which are reverting to forest; (4) a

GAIN AND LOSS OF IMPROVED FARM LAND FOR THE DECADE 1910-1920

Counties	Net Gain in the Area of Improved Farm Land in Acres	Net Loss in the Area of Improved Farm Land in Acres	Total Unimproved Land in Acres
Anderson	105		36,367(28.2)
Boone		3,788	32,863(20.4)
Bourbon		12,422	24,428(12.5)
Boyle	775		31,900(26.8)
Bracken		28,664	42,523(32.6)
Campbell		12,965	28,146(30.3)
Carroll		6,854	25,136(29.7)
Clark		6,865	39,868(23.5)
Fayette	354		18,152(10.5)
Franklin		5,661	26,624(20.9)
Gallatin	4,545		13,383(19.1)
Garrard	182		40,013(26.3)
Grant		17,705	49,371(29.2)
Harrison		40,284	64,160(32.2)
Henry	457		38,220(19.7)
Jessamine	12,150		21,930(19.9)
Kenton		10,409	39,562(37.9)
Madison	640		63,390(22.2)
Mason		7,628	14,772(10.1)
Mercer	5,275		30,417(18.1)
Montgomery	3,545		29,994(23.6)
Nicholas	3,938		30,537(22.9)
Owen		17,759	66,229(28.1)
Pendleton		28,669	52,773(29.5)
Robertson		8,728	23,290(33.3)
Scott		18,878	30,845(16.6)
Shelby		6,344	63,028(23.0)
Spencer		639	29,785(25.0)
Washington		9,979	49,407(25.8)
Woodford		6,964	25,506(20.4)
Totals	31.966	251,205	1,082,629(23.5)

Figures in parenthesis indicate the percentage of the total land area of each county represented by the unimproved land.

Data for the net loss and net gain of the improved acreage and the total unimproved acreage from the 14th Census.

small amount of land which needs drainage or both clearing and drainage. The first three of these classes embrace more than 99% of all the unimproved land in the Blue Grass.

The land in class (1) will remain out of agricultural use permanently; small gains of improved land may be made by clearing the lands in class (2), which occurs largely in the Inner and Outer Blue Grass; the unimproved land in class (3) is increasing at a rapid rate, especially in the Eden Shale Belt. In the decade 1910-1920, the area of unimproved land in Owen County alone increased by 17,760 acres or a trifle over 9% of the area of the county. This increase in the unimproved acreage was almost entirely the result of the passing out of agricultural use of some of the steeper slopes. Unimproved lands in class (4) are of small areal extent and in major part are only temporarily out of agricultural use. The total area reported as needing drainage in 1919 was only 6,622 acres or a trifle over one-tenths of one per cent of the total area of the Blue Grass.

The state as a whole witnessed a decrease in the acreage of unimproved farm land for each decade prior to 1910. The area of unimproved farm land in the Blue Grass, however, reached its minimum in 1900, and in the case of individual counties, somewhat earlier. In general, the counties which were settled first, either as a result of proximity to points of debarkation on the Ohio River or to superior soils as in the Inner Blue Grass, reached the minimum earlier than did those counties more unfavorably located as regards river highways or soil and topographic conditions. Since 1900, the acreage of unimproved land has increased steadily, the rate of increase being most rapid in the Eden Shale Belt and hardly noticeable in the Inner Blue Grass. The combined shrinkage in the area of the improved farm land of the Inner Blue Grass counties of Fayette, Woodford and Jessamine between 1890 and 1920 was only 3,855 acres, whereas Owen County alone, in the Eden Shale Belt, lost 17,795 acres during the single decade, 1910-1920.

The increase in the unimproved acreage in the Blue Grass is only in minor degree the result of the passing out of agricultural use of land in the Inner and Outer Blue Grass areas. The increase, which has been confined largely to the Eden Shale Belt, is only a repetition of what has occurred elsewhere in the state

in the timbered, hilly sections. Up to a certain point, the clearing of slopes offsets losses due to the abandonment of fields which can no longer be cultivated profitably. As long as the amount of uncleared land is sufficiently large, clearing offsets the losses due

Plate XVI. A badly eroded field in the Eden Shale Belt. The field still affords scanty pasturage. Anderson County west of Lawrenceburg.

to the abandonment of fields, but with the decrease in the area of uncleared land, reversion of cleared fields to forest more than balances gains by clearing.

At present, nearly 70% of the unimproved land in the Blue Grass is in farms. In the farms of many counties, the improved land comprises 90% of the entire farm; in Fayette County it rises to nearly 95% and the average for the entire Blue Grass is 82%. Practically all of the unimproved land not in farms is either not topographically suited to agricultural use or the soils are too thin for successful crop production.

No permanent expansion of the agricultural area in the Blue Grass can be expected, rather a decrease is probable. Equilibrium was reached about 1900 as regards gains by clearing as opposed to losses by erosion on the steeper slopes. Since that

date, losses have occurred at a continually increasing rate in all the counties of the Eden Shale Belt, but have been negligible in both the Inner and Outer Blue Grass. Still further losses of improved land may be expected in the Eden Shale Belt; many of

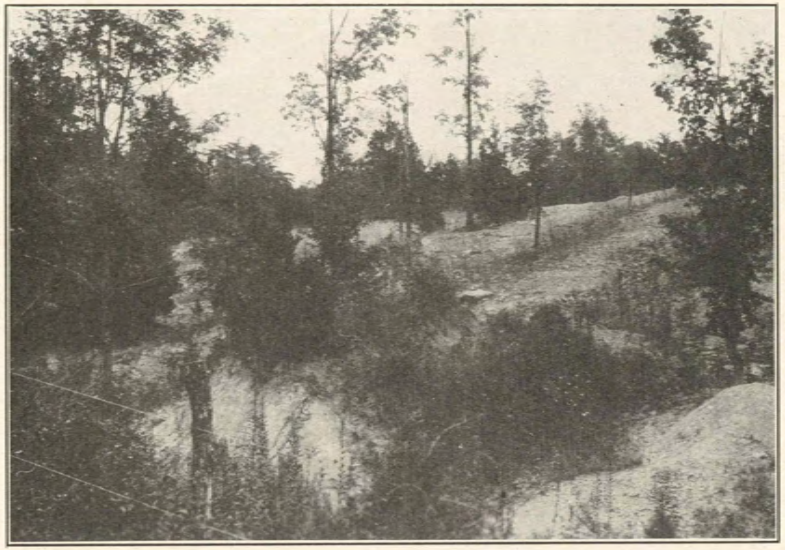

Plate XVII. A field completely ruined by erosion. In process of reversion to forest. Anderson County near Harrisonville.

the slopes now being cultivated are already badly eroded, so that it is a question of only a few years before they are allowed to revert to forest. In many portions of the Eden Shale Belt, the area as a whole gives the impression of wholesale abandonment to forest growth. (See Pls. X, XVII, XVIII). In both the Inner and Outer Blue Grass, however, the limits of agriculture are essentially permanent.

The table which follows indicates present day conditions. Improved land in farms as shown will decrease, particularly in the Eden Shale Belt. Unimproved land in farms, other than woodland in farms, represents eroded fields, ruined under abuse in agricultural use. A continuance of present trends indicates a great increase in the areal extent of this class of unimproved land.

1920 LAND TABLES

Counties	Area in Acres	Improved Land in Farms Acres	Percentage of Land Surface Improved	Woodland in Farms Acres	Other Unimproved Land in Farms Acres	Unimproved Land Not in Farms Acres	Total Unimproved Land Acres	Percentage of Land Surface Improved	Percentage of Total Surface Improved Farm Land
Anderson	128,640	92,273	71.9	8,612	27,638	117	36,367	28.1	28.1
Boone	160,640	127,777	79.5	10,303	13,162	9,398	32,863	20.4	14.6
Bourbon	194,560	170,132	87.4	4,552	4,522	15,354	24,428	12.5	4.6
Boyle	119,040	87,140	73.2	21,360	2,773	7,767	31,900	26.7	20.2
Bracken	130,560	88,037	67.4	6,981	27,782	7,760	42,523	32.6	26.6
Campbell	92,800	64,654	69.6	4,985	11,828	11,333	28,146	30.3	18.1
Carroll	84,480	59,344	70.2	10,517	8,363	6,256	25,136	29.7	22.2
Clark	169,600	129,732	76.4	10,369	14,467	15,032	39,868	23.5	14.6
Fayette	172,160	154,008	89.4	2,733	14,467	11,818	18,152	10.5	3.6
Franklin	127,360	100,676	79.0	6,468	3,601	693	26,684	20.9	20.4
Gallatin	69,760	56,377	80.8	4,198	19,523	4,470	13,383	19.1	12.7
Garrard	151,680	111,667	73.6	12,793	4,715	22,646	40,013	26.3	11.4
Grant	168,960	119,589	70.8	12,024	4,574	12,899	49,371	29.2	21.6
Harrison	199,040	134,880	67.7	9,059	24,448	24,456	64,160	32.2	19.9
Henry	193,920	155,700	80.2	7,246	14,409	16,565	38,220	19.7	11.1
Jessamine	110,080	88,150	80.0	5,158	7,062	9,710	21,930	19.9	11.1
Kenton	104,320	64,758	62.0	5,487	12,311	21,764	39,562	37.9	17.0
Madison	285,440	222,050	77.7	22,470	10,931	29.989	63,390	22.2	11.7
Mason	145,280	130,508	89.8	3,042	10,232	1,498	14,772	10.1	9.1
Mercer	161,920	131,503	81.2	4,619	11,770	14,028	30,417	18.1	10.1
Montgomery	126,720	96,776	76.3	15,654	5,154	9,136	29,944	23.6	16.4
Nicholas	133,120	102,583	77.0	7,219	9,755	13,563	30,537	22.9	12.7
Owen	234,880	168,651	71.8	10,057	22,688	33,484	66,229	28.1	13.9
Pendleton	178,560	125,787	70.4	7,742	39,623	5,358	52,773	29.5	26.5
Robertson	69,760	46,470	66.6	6,621	7,352	9,317	23,290	33.3	20.0
Scott	184,960	154,115	83.3	6,385	16,102	8,358	30,845	16.6	12.1
Shelby	273,280	210,252	78.9	8,761	19,913	34,354	63,028	23.0	10.4
Spencer	119,040	89,255	74.9	8,971	17,995	2,819	29,785	25.0	22.6
Washington	191,360	141,953	74.1	8,829	37,817	2,761	49,407	25.8	24.3
Woodford	124,800	99,294	79.5	5,189	8,333	11,984	25,506	20.4	10.8
Totals	4,606,720	3,524,091	76.4	258,404	449,538	374,687	1,082,629	23.5	15.3

Data from 14th Census.

Drainage

Topographic conditions are such that the run off is not retarded, consequently artificial drainage is unnecessary in most portions of the Blue Grass. In addition, the nature of the underlying rocks is often such that underground channels effectually carry off the water which might normally accumulate in surface depressions. This, in all probability, has some effect in minimizing slope wash in the Inner Blue Grass, where subsurface drainage is best developed. On the bottoms of the larger rivers and in a few other regions of limited areal extent, artificial drainage might be beneficial, but the total acreage to be gained for agriculture by drainage constitutes but a fraction of one per cent of the total area of the Blue Grass. Data are not available for an accurate quantitative statement as to the amount of land which could be drained to advantage.

The accompanying tabulation of data from the Bulletin on Drainage of the 14th Census shows that but four counties made returns, which indicates the small importance of the drainage problem in the Blue Grass, except locally.

DRAINAGE

Counties	Farm Land Reported as Provided with Drainage Acres	Farm Land Reported as Needing Drainage Acres	Land Needing Drainage Only Acres	Land Needing Drainage and Clearing Acres	No. of Farms in Drainage and Levee Districts
Anderson	822	1,051	141	910	.....
Madison	1,218	3,645	849	2,796	3
Shelby	586	874	35	839	1
Spencer	1,425	1,052	75	977	1
Totals	4,051	6,622	1,100	5,522	5

(Data from 14th Census.)

Timber and Its Uses

The Blue Grass forest is a part of the Southern Hardwood Forest, the Kentucky portion being classified by Schantz, Zon and Fernon as the Chestnut, Chestnut-Oak, Yellow Poplar subdivision of the larger forest region which embraces portions of

several states. The virgin forest, which once covered much of the Blue Grass, contained a very valuable stand of hardwood timber. Much of this was destroyed over a century ago in the process of clearing the land for agricultural use, though a certain fraction was preserved down to quite a recent date. Garman states that "during the ten years preceding 1899, $5,000,000 are claimed to have been paid for walnut timber sold out of Blue Grass Kentucky" and that "from $10,000 to $15,000 were paid for walnut timber on single farms, and $30,000 is said to have been offered and refused for the walnut on a very large tract in Woodford County." (1) At the present time, the existing forest resource is very limited and of local value only.

The species represented are numerous, probably brought together by various agencies. In part, they doubtless represent invasions from the mountains to the east. There is little in the present distribution of species to indicate that any considerable number came from either the north or the west. (2) The distribution of various conifers, as the scrub pine and the red cedar, indicates the general tendency of spread from east to west. Migration of species has quite generally been along stream courses in this area as elsewhere is the timbered portions of the Mississippi Valley.

The great forest wealth of central Kentucky was probably the result of the location of the area rather than a consequence of the varied and fertile soils, the diversity of surface and the favorable climatic conditions. (3) As the ice retreated to the north after the last glacial invasion, forest growth followed stream courses with the amelioration of the climate and established itself on the fertile soils of the Blue Grass. The great variety of species is indicated by the fact that out of twenty-two species of oaks in Eastern North America, twenty occur in the state, and out of these twenty, eighteen are found in one or more counties of the Blue Grass.

It is in general true that a given species has a wide distribution. Moisture, temperature, surface configuration and means of dispersal being favorable, a species will grow under a variety of soil conditions. In the case of some species, as the black walnut, conditions for growth are apparently favorable over the entire area. However, in certain portions, as the Eden

DISTRIBUTION OF CHARCTERISTIC NATIVE TREES

	Red Cedar	Black Walnut	Hickories	Ironwood	Beech	White Oak	Burr Oak	Chinquapin Oak	Red Oak	Black Oak	White Elm	Hackberry	Yellow Poplar	Sassafras	Sweet Gum	Black Cherry	Wild Plum	Ky. Coffee Tree	Honey Locust	Red Bud	Black Locust	Sugar Maple	Soft Maple	Ohio Buckeye	Honey Dogwood	Black Gum	Persimmon	White Ash
Anderson																												
Boone																												
Bourbon	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√		√	√
Boyle	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√
Bracken		√	√		√	√			√			√		√	√	√	√		√		√	√	√			√	√	√
Campbell	√	√	√		√	√		√	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Carroll	√	√	√		√	√	√	√	√	√	√	√			√	√		√	√	√	√	√	√	√	√		√	√
Clark		√	√				√	√	√			√					√			√	√					√	√
Fayette	√	√	√	√	√	√	√	√	√		√	√	√			√	√	√	√	√	√	√	√	√	√		√	√
Franklin	√	√		√		√		√			√	√				√		√	√	√	√	√	√	√	√		√	
Gallatin	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Garrard	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Grant	√	√	√	√		√	√		√	√	√	√		√			√		√	√	√	√	√	√	√	√	√	√
Harrison		√	√			√	√	√	√		√	√		√		√	√	√	√	√	√	√	√		√		√	√
Henry		√	√			√			√										√		√							
Jessamine	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√		√	√	√	√	√		√	√		√
Kenton		√	√		√	√		√	√		√	√		√			√	√	√		√	√						
Madison	√	√	√	√		√	√	√	√	√		√		√	√	√	√	√	√	√	√	√	√				√	
Mason		√	√		√	√	√		√	√		√	√	√		√	√	√	√	√	√	√	√	√			√	
Mercer	√	√	√	√	√	√	√		√		√	√	√				√	√	√	√	√	√	√	√	√		√	√
Montgomery	√	√	√		√	√	√		√		√	√		√	√	√	√		√		√	√	√		√	√	√	√
Nicholas	√	√	√		√	√	√		√	√	√	√		√	√	√	√		√	√	√	√	√		√	√	√	√
Owen	√	√	√		√	√	√	√	√			√		√					√	√	√	√	√		√		√	√
Pendleton	√	√	√	√	√	√	√		√	√	√	√		√	√	√	√	√	√		√	√	√		√	√	√	√
Robertson		√	√		√	√	√	√	√	√	√			√	√	√	√	√	√	√	√	√			√	√	√	√
Scott	√	√	√		√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√
Shelby	√	√	√	√	√	√	√	√	√		√	√		√		√	√	√	√	√	√	√		√	√		√	√
Spencer	√	√	√	√	√	√	√	√	√	√	√	√		√		√	√	√	√	√	√	√	√	√	√	√	√	√
Washington		√	√		√	√			√	√		√		√		√	√	√	√	√	√	√	√				√	√
Woodford	√	√	√				√	√			√	√	√	√		√	√	√	√	√	√	√	√	√	√		√	√
	20	28	27	11	21	26	21	19	26	16	21	26	10	22	13	22	22	19	27	21	28	27	23	14	21	13	25	23

Tabulation from Bull. No. 169, Ky. Agr. Exp. Sta., 1916.

Shale Belt, the percentage of the total forest growth which a given species constitutes is frequently different than in either the Inner or Outer Blue Grass. For example, beech which is relatively uncommon in the Inner Blue Grass at the present time, is a rather conspicuous element of the forest in the Eden Shale Belt. This variation in characteristic trees in the different sub-regions has already been discussed in connection with the characteristics of the various sub-regions. (See Chapter II)

The accompanying tabulation of the areas of occurrence of twenty-eight of the principal species of forest trees in the Blue Grass is a compilation. It is undoubtedly incorrect in that several of the species have a wider range than shown. It is also faulty in that it does not show the comparative abundance of a given species in the various counties. It is of value principally as indicating the great similarity of the composition of the Blue Grass forest in the different portions of the area and as giving certain definite areas of occurrence for the different species. It has seemed best to tabulate the material in this form and to add such supplementary information as is available in the accompanying text.

In addition to the forest growth proper, the clearing and subsequent abandonment of fields as they became non-productive under abuse have produced an old field type of growth in which characteristic elements are sassafras, persimmon and various shrubs, together with oaks, locust and some conifers. These old field growths, except in the Eden Shale Belt, are not characteristic, and even there the reversion of the fields has been so recent in most cases that the stand is very scattered. (See Plate XVIII).

Few logs are being marketed and little lumber is being cut in any portion of the Blue Grass at the present time. For use on the farms, for the construction of barns and outbuildings, a limited amount of lumber is still sawed locally by small portable saws as shown in Plate XIX. This is particularly true in the Eden Shale Belt. In the Inner Blue Grass, and to a lesser extent in the Outer Blue Grass as well, the isolated trees which stand in both cultivated fields and pastures are preserved, partially to afford shade for stock, but largely as a matter of sentiment. Many of these pastures with their numerous large trees

are extremely pleasing to the eye. (See Pls. I and XXI). In the Eden Shale Belt, however, it is not uncommon to see corn or tobacco planted in fields in which the trees have been killed by girdling. (See Pl. XXIII). In the Outer Blue Grass, where

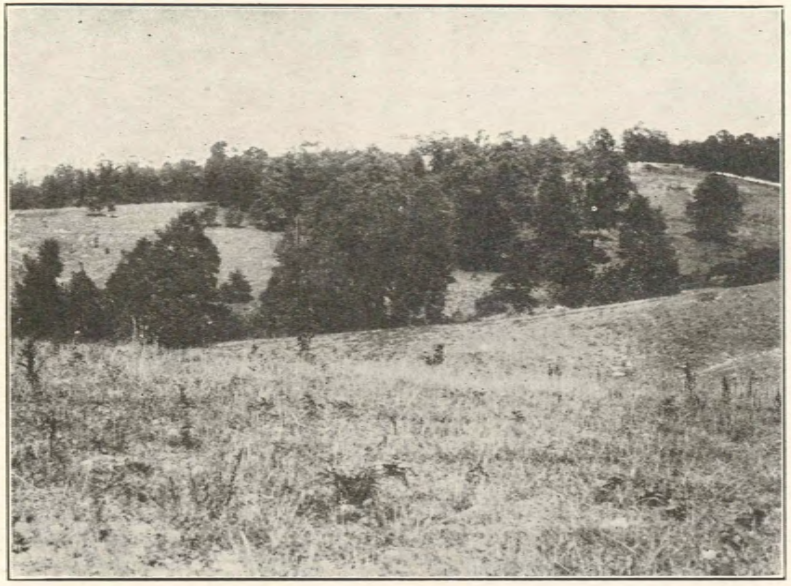

Plate XVIII. Trees capturing a field in the Eden Shale Belt, Pea Ridge, Scott County.

the larger estates disappear and the esthetic yields to the practical and maximum crop yield becomes of paramount importance, trees are few in number or lacking in cultivated fields and pastures.

Although the Blue Grass is not today an important factor in lumber production, certain portions of the Eden Shale Belt could be used most effectively for that purpose. The effect of the depletion of our national supply of the better hardwoods is already being felt by furniture and vehicle makers, leading to a substitution of less desirable woods for oak, poplar and walnut. In 1909, oak constituted 74%, poplar 13% and gum 1% of the wood used by furniture manufacturers. By 1919, the insufficient supply and high price of oak and poplar had altered the situation to such an extent that oak and popular constituted only 60% and 6% respectively of the total, whereas the percent-

age of gum had risen to 21%. (4) Today, gum has practically displaced walnut, except for veneer work; poplar has virtually disappeared from use and oak is high in price and often of poor quality.

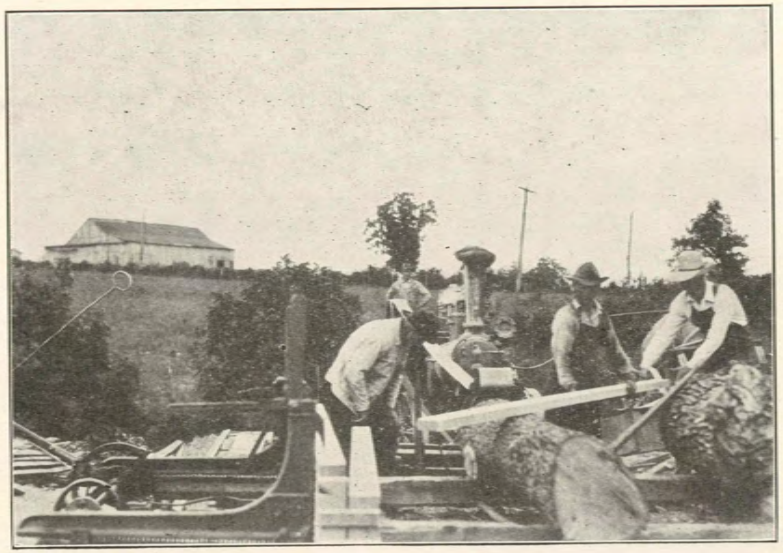

Plate XIX. Cutting oak lumber for farm use with a small portable saw. Near Neave, Bracken County.

It is not probable that either the Inner or Outer Blue Grass will ever again be important producers of hardwood lumber. The hardwood lands of these sub-regions, in common with other former hardwood producing areas such as Ohio, Indiana and Illinois, once cleared of timber remain in agricultural use. High grade land, with fertile soils and favorable climate and topography, can never be counted on as a source of any considerable permanent supply of lumber. In the Eden Shale Belt, however, conditions are far different. Slopes are often steep and soils are thin and wash badly. Trees do very well on these steep, well drained slopes. Rainfall is abundant and well distributed; the growing season is long so that certain valuable species, such as yellow poplar and walnut, find an ideal habitat. As prices continue to advance with failing supply, silviculture may be expected to yield better returns on these slopes than can be secured from crops of corn.

In the Eden Shale Belt, it is doubtful whether 25% of the land can be cropped permanently and profitably. Certainly a large fraction, probably between 25% and 35%, would yield better returns from forestry if practiced intelligently than it does under present use, as much of the land is idle and brings in no return except as it furnishes scanty pasturage.

The practice of cropping steep slopes is a short-sighted and unwise procedure. It does not lead to the permanency of agriculture; it is an expedient which only temporarily increases the area under the plow, and very shortly leads to a permanent reduction in the amount of land which can be cultivated successfully. In addition, the attractiveness of an area is decreased greatly by the removal of the timber. Tree clad slopes would add to the beauty of the Eden Shale Belt; denuded and eroded hillsides grown up in sprouts advertise the area unfavorably and make conditions appear worse than the reality. Travellers passing through the Blue Grass from north to south traverse many miles of this type of country, irrespective of whether they travel by road or train. Forested slopes would not only be more pleasing in appearance but more profitable than run down, washed and abandoned fields.

The temporary use of the slopes injures the bottom lands by the deposition of silt, blocks the streams, decreasing their availability for navigation and the development of hydro-electric power, and increases the rapidity of run off. This last intensifies seasonal fluctuation in the streams, decreasing their usefulness for navigation and the development of power. Floods in these streams help to swell the volume of the Ohio and Mississippi rivers, inflicting damage in areas outside the state as well as locally.

The productivity of the Eden Shale Belt is decreasing. A considerable fraction of the surface is now non-productive and this area is increasing in extent. Reforestation is indicated as a solution of the difficulty in the case of the steeper slopes. Haphazard reforestation by improper species is undesirable therefore steps should be taken to secure the proper character of tree growth.

To insure the profitable character of reforestation projects, the state should pursue an enlightened policy with regard to the

taxation of lands devoted to timber growth. Only by an adjustment of taxes which will render forestry profitable can any important addition to the forested area be made. The failure on the part of the state to adopt a liberal and rational attitude toward the question of taxation of lands devoted to the production of a tree crop will lead to a net loss of revenue and the ruination of a large fraction of the land surface of the Eden Shale Belt.

The reforestation of this and other areas of similar character in other portions of the state is of far more than local importance. The proper functioning of many industries and the convenience of many individuals far removed from the area of timber production necessitate an adequate supply of lumber at reasonable prices. Under the circumstances, the state can well afford to formulate a program of progressive character looking forward to the reforestation of this and similar areas, a program embodying a sane scheme of taxation which will make the growing of timber an enterprise upon which capital may embark with assurance of reasonable returns on the money invested.

Attractiveness of the Area

The Blue Grass can lay legitimate claim to possessing a certain type of attraction second to that of no area of equal size in North America. Fayette County, representative of the Inner Blue Grass, is one of the most pleasing agricultural areas in the United States. Pastures and fields are gently rolling and are frequently almost grove-like in character, so numerous are the trees. Many of the fields contain small lakes or sink holes. This is an area in which there is much fine stock; horses, cattle, and sheep. Wide paved and macadam pikes traverse all portions of the county; stone fences flank these roads for miles and beautiful farm homes, set well back from the highway in groves of large oaks, furnish a rural setting which it is difficult to portray adequately. (See Pls. I, II, III, XXIX, XXX, XXXIV, and XLII.)

Along the larger rivers, the landscape is quite different. The river valleys are exceedingly picturesque. For many miles the Kentucky flows through a gorge with rock walls often rising vertically from the water's edge. (See Pl. XL.) The Licking River, which is paralleled by the Louisville and Nashville Railroad, flows through a gorge of somewhat lesser attractiveness though of similar character. In the spring, the walls of the gorges with the redbud blossoms against the gray background of limestone are very beautiful.

Tourist travel into this area is beginning, and with the completion of a good highway from Cincinnati to Lexington, it should increase. The Blue Grass is distinctly southern in character and abounds in localities of great historic interest. The attractiveness of the rural section and the great natural beauty of the area, together with the many points of historical interest, make this a region of more than ordinary appeal.

IMPROVED LAND

Farms

During the four decades ending in 1920, the following changes occurred in the farms: (1) The number of farms increased over 40%; (2) The average size of farms decreased by approximately the same percentage; (3) Improved land in farms suffered a very slight shrinkage in area; (4) Land increased greatly in value, more than doubling in price during the single decade 1910-1920.

For the Blue Grass as a whole, every decade up to 1920 witnessed an increase in the number of farms. This increase may be expected to continue for at least another decade. In many of the counties of the Eden Shale Belt, however, the number of farms decreased between 1910 and 1920; in none of these counties was the increase in number appreciable. In Fayette and Shelby counties, representative of conditions in the Inner and Outer Blue Grass, however, the number of farms increased by 40% and 17% respectively during the same decade. In the Eden Shale Belt, the number of farms has already passed the maximum; for the Inner and Outer Blue Grass, the maximum number has not as yet been reached. For a limited period of time, increase in the number of farms in the Inner and Outer Blue Grass may be expected to offset the loss in number in the Eden Shale Belt, but thereafter the entire area will probably suffer a small decrease in the number of farms.

NUMBER OF FARMS—1880-1920

Counties	1880	1890	1900	1910	1920	Percentage of Change in No. of Farms 1880-1920
Anderson	1,205	1,092	1,255	1,579	1,650	66.9
Boone	1,354	1,501	1,598	1,540	1,831	35.2
Bourbon	932	1,048	1,348	1,396	1,886	102.3
Boyle	884	701	875	1,135	1,394	57.6
Bracken	1,692	1,820	1,711	1,899	1,812	7.0
Campbell	1,563	1,534	1,622	1,567	1,423	—9.8
Carroll	905	897	1,254	1,171	1,068	18.0
Clark	1,214	1,189	1,373	1,516	1,656	36.4
Fayette	1,071	1,065	1,245	1,405	1,978	84.6
Franklin	1,296	1,411	1,668	1,711	1,880	45.0
Gallatin	569	535	797	777	802	40.9
Garrard	1,099	1,083	1,306	1,852	1,929	75.5
Grant	1,976	1,642	2,056	1,920	2,075	4.4
Harrison	1,804	2,003	2,456	2,607	2,424	34.3
Henry	1,473	1,571	2,127	2,329	2,578	75.0
Jessamine	896	931	983	1,285	1,534	71.2
Kenton	1,299	1,422	1,392	1,302	1,334	2.7
Madison	2,048	2,346	2,741	3,770	3,558	73.2
Mason	1,274	1,406	1,572	1,685	2,191	71.9
Mercer	1,406	1,522	1,590	1,714	2,065	46.8
Montgomery	1,013	977	1,222	1,369	1,475	45.6
Nicholas	1,329	1,165	1,634	1,804	1,904	43.0
Owen	2,467	2,212	2,764	2,809	2,733	10.7
Pendleton	2,293	2,177	2,483	2,252	2,331	1.6
Robertson	869	845	979	862	992	14.1
Scott	1,337	1,541	1,921	1,914	2,168	62.1
Shelby	1,625	1,513	1,997	2,301	2,709	66.7
Spencer	810	894	1,084	1,348	1,518	87.4
Washington	1,770	1,751	2,052	2,133	2,499	41.1
Woodford	661	674	1,053	1,133	1,351	104.0
Total No. of farms	40,134	40,468	48,158	52,085	56,748	41.3

Changes in number of farms and percentage changes for total area by decades 1880-1920.

Changes in Number		Percentage Changes	
1910-1920	4,663	1910-1920	8.9%
1900-1910	3,927	1900-1910	8.1%
1890-1900	7,690	1890-1900	19.0%
1880-1890	334	1880-1890	0.83%

(Data from U. S. Census.)

The increase in the number of farms, which occurred in practically all counties up to 1900, and which is still occurring in all portions of both the Inner and Outer Blue Grass, involved very little if any extension of the area included in farms. The increase in number was largely the result of subdivision of previously existing farms with a corresponding reduction in the size of the individual farm. The process of subdivision has increased the number of farms by 41% during the past forty years, whereas the addition of land not previously included in farms during the same period has been so small in amount as to be negligible.

The actual increase in the number of farms, as well as the percentage of increase, was greatest for the decade ending in 1900. The end of this decade marks the termination of a period of rapid increase in the number of farms in other portions of the state as well as in the Blue Grass.

The increase in number of farms has been most marked in the counties of the Inner Blue Grass, Fayette, Bourbon, Woodford and Jessamine counties having increases of 84.6%, 102.3%, 104% and 71% respectively during the forty year period ending in 1920. In the Outer Blue Grass, the percentage increase in the number of farms during the same period is also high, Henry and Shelby counties showing increases of 75% and 66.7% respectively. On the other hand, counties lying in major portion in the Eden Shale Belt, as Owen, Grant and Pendleton counties, during the same period had increases in the number of farms of only 10.7%, 4.4% and 1.6% respectively. These percentages also represent with considerable accuracy the relative probability as to future increases in the number of farms in these counties, showing as they do existing trend as regards subdivision.

The explanation of this difference in the rate of increase in the number of farms in the three sub-regions of the Blue Grass is either directly or indirectly connected with topographic and soil conditions. In both the Inner and Outer Blue Grass, and this is especially true of the Inner Blue Grass, there were and still are many large estates. With favorable soil and topographic conditions, such as exist in these two sub-regions, the small farm is an economic possibility with tobacco as a major crop, therefore subdivision of the large farms is logical, has oc-

curred and will continue for some time, as large estates are split up. In the Eden Shale Belt, however, farms have not been extremely large during any portion of the past four decades as topographic conditions and soils have never rendered the area especially attractive to anyone wishing to be a large landholder. These same conditions prevent as well too great a reduction in the size of the farms, hence subdivision has already reached a maximum and in places has already exceeded the optimum for the area, hence farms are decreasing in number in certain counties.

The average farm in the Blue Grass is below the state average in size. This has been true at all times during the past forty years, though the gap has been closing steadily during that period, as the percentage of reduction in size has been somewhat less in the Blue Grass than in the state as a whole. The state-wide tendency toward a decrease in the size of farms has been held in check somewhat, particularly in the counties of the Inner Blue Grass, by the attractiveness of agricultural holdings and the prestige attaching to country estates. Inspection of the accompanying table will reveal the fact that an average farm in the counties of the Inner Blue Grass as Fayette, Woodford, and Bourbon is approximately 90 acres in extent. whereas in the poorer, hilly counties of the Eden Shale Belt, as in Owen, Grant, and Pendleton counties, the average farm is 75 acres or less in extent.

The decrease in the size of the farms has been produced by subdivision of previously existing farms with the resultant increase in the number of farms discussed previously. The present average farm size is not excessively low for the area as a whole, although in the Eden Shale Belt there are many farms which are much too small in view of topographic conditions. Such small farms necessitate a cropping system which is proving disastrous to the area. Any considerable reduction in the size of farms in this sub-region is not to be expected. The probability is that the farms will increase in size as agricultural practice is so modified that the area is used to better advantage.

With each succeeding decade, the gap between the size of the average farm in the counties of the Inner Blue Grass and those of the Eden Shale Belt has been closing as the larger

estates have been split up into smaller holdings. In 1880, an average farm in the Inner Blue Grass was aproximately 50% greater in areal extent than one in the Eden Shale Belt. By 1920, this percentage difference had decreased to about 20%.

AVERAGE SIZE OF FARMS BY DECADES—1880-1920

Counties	1880	1890	1900	1910	1920
Anderson	94	102	93.0	87.7	77.9
Boone	121	99	93.4	94.6	82.6
Bourbon	193	162	129.4	136.0	95.0
Boyle	131	146	124.4	97.4	79.8
Bracken	71	66	74.2	64.5	67.8
Campbell	56	56	52.4	56.3	57.3
Carroll	94	84	74.1	68.8	72.0
Clark	172	123	107.1	98.9	93.3
Fayette	143	159	143.7	117.8	81.1
Franklin	90	86	77.4	73.2	67.4
Gallatin	99	96	79.1	75.4	81.4
Garrard	127	121	99.1	69.0	66.9
Grant	85	97	75.3	81.5	75.2
Harrison	105	91	79.2	74.0	72.0
Henry	109	112	82.6	76.5	68.8
Jessamine	143	109	100.4	77.7	65.4
Kenton	69	70	68.4	66.4	61.9
Madison	126	108	97.5	69.1	71.8
Mason	110	102	90.8	87.1	65.6
Mercer	104	100	94.8	88.6	71.6
Montgomery	141	116	107.7	85.2	79.7
Nicholas	93	94	73.0	62.7	62.8
Owen	82	97	74.5	76.1	73.7
Pendleton	77	77	63.9	75.2	74.3
Robertson	71	70	60.6	70.2	60.9
Scott	148	116	96.9	97.4	80.8
Shelby	143	146	117.2	103.8	88.2
Spencer	160	132	108.0	86.3	76.6
Washington	106	107	91.5	87.1	75.5
Woodford	179	161	112.7	107.1	83.5
Average for the Blue Grass	114.73	106.83	90.41	83.43	74.36
Average for the State	129.0	119.0	93.6	85.6	79.9

All areas stated in acres. (Data from U. S. Census.)

There is no economic barrier to prevent a much further reduction in size of the farms of the areas of more gently rolling topography. There is practically no waste land in such regions and the soils are of high fertility. Farms of fifty to sixty acres are ample in size to support a family in comfort with present agricultural practice. A continuance of present trends indicates a considerable reduction in the size of the farms of both the Inner and Outer Blue Grass. The only factor which may hold this subdivision in check is the fact, that for the establishment of agricultural estates of considerable areal extent, few if any other sections of the United States present so attractive a setting, this being particularly true of the Inner Blue Grass.

In the Blue Grass, the number of acres of improved land per farm, the percentage of land in farms improved, and the percentage of land in farms are all above the state average. In 1920, for example, 76.4% of the land surface in the Blue Grass was improved as against a state average of 54.3%, and of the land in farms, 82% was improved as compared with a state average of 64.7%. This same condition has existed for the past four decades. This relationship between total land surface and the percentage of land improved indicates the agricultural desirability of the Blue Grass by comparison with other portions of the state.

During the past four decades, there has been a steady decrease in the number of acres of improved land per farm accompanying the decrease in the size of the farms, and since 1900, the percentage of the land in farms improved has decreased as well.

In the counties of the Inner Blue Grass, however, the percentage of land in farms improved has increased rather than decreased and the same is true in lesser degree in the Outer Blue Grass counties. Bourbon, Fayette and Woodford, typical Inner Blue Grass counties, show increases of 5.9%, 18% and 3% respectively in the percentage of the land in farms improved during the period 1900-1920. Some of the counties of the Inner Blue Grass show a slight loss, as Jessamine County with a loss of 1.2%, during the same period, but these small losses are more than compensated for by gains in other counties. There can, however, be very slight gain in the future in the percentage of land in farms improved in the Inner Blue Grass, as such a high percentage of all the land in farms is improved at pres-

IMPROVED LAND IN FARMS—1890-1920. AVERAGE NUMBER OF ACRES PER FARM

Counties	1890	1900	1910	1920
Anderson	102 (79)	93.0 (83)	78.7 (74)	77.9 (71.8)
Boone	99 (89)	93.4 (92)	94.6 (90)	82.6 (84.5)
Bourbon	162 (95)	129.4 (89)	136.0 (96)	95.0 (94.9)
Boyle	146 (81)	124.4 (73)	97.4 (78)	79.8 (78.3)
Bracken	66 (98)	74.2 (88)	64.5 (95)	67.8 (71.7)
Campbell	36 (89)	52.4 (87)	56.3 (87)	57.3 (79.4)
Carroll	84 (82)	74.4 (84)	68.8 (82)	72.0 (75.9)
Clark	123 (85)	107.1 (84)	98.9 (91)	93.3 (83.9)
Fayette	159 (93)	143.7 (78)	117.8 (92)	81.1 (96.0)
Franklin	86 (83)	77.4 (85)	73.2 (84)	67.4 (79.5)
Gallatin	96 (88)	79.1 (90)	75.4 (88)	81.4 (86.3)
Garrard	121 (81)	99.1 (87)	69.0 (87)	66.9 (86.5)
Grant	97 (84)	75.3 (90)	81.5 (87)	75.2 (76.6)
Harrison	91 (86)	79.2 (87)	74.0 (89)	72.0 (77.3)
Henry	112 (84)	82.6 (88)	76.5 (87)	68.8 (87.8)
Jessamine	109 (87)	100.4 (89)	77.7 (76)	65.4 (87.8)
Kenton	70 (91)	68.4 (91)	66.4 (86)	61.9 (78.4)
Madison	108 (84)	97.5 (85)	69.1 (84)	71.8 (86.9)
Mason	102 (93)	90.8 (94)	87.1 (94)	65.6 (90.8)
Mercer	100 (82)	94.8 (88)	88.6 (83)	71.6 (88.9)
Montgomery	116 (81)	107.7 (78)	85.2 (80)	79.7 (82.3)
Nicholas	94 (92)	73.0 (88)	62.7 (87)	62.8 (85.8)
Owen	97 (83)	74.5 (88)	76.1 (87)	63.7 (83.7)
Pendleton	77 (86)	63.9 (95)	75.2 (91)	74.3 (72.6)
Robertson	70 (86)	60.6 (91)	70.2 (91)	60.9 (76.9)
Scott	116 (88)	96.9 (91)	97.4 (92)	80.8 (87.3)
Shelby	146 (79)	117.2 (87)	103.8 (90)	88.2 (88.0)
Spencer	132 (75)	108.0 (80)	86.3 (78)	76.6 (76.8)
Washington	107 (81)	91.5 (83)	87.1 (81)	75.5 (75.3)
Woodford	161 (89)	112.7 (85)	107.1 (87)	83.5 (88)
Average for the Blue Grass	106.83(80)	90.41(92)	83.43(87)	74.36(82)
Average for the State	65.9(55.2)	58.5(62.5)	55.3(64.6)	51.6 (64.7)

Figures in parenthesis after number of acres per farm indicate the per cent of the land in the farm improved.

(Data from U. S. Census.)

ent. For example, in Fayette County, the percentage rises to 96%, and in Bourbon County, to 95%. Similarly, little addition to the percentage of land in farms improved may be expected in the Outer Blue Grass. Shelby and Henry counties, typical Outer Blue Grass counties, show practically no change in the percentage of land in farms improved during the past twenty years, and the percentage is already so high (88% for Shelby County and 87.1% for Henry County) that little further addition can be expected.

The decrease in the percentage of land in farms improved, which has occurred since 1900, has been confined almost entirely to the Eden Shale Belt, but the loss there has been sufficient to offset the gains in the Inner and Outer Blue Grass. In Pendleton County, during this period, the percentage of land in farms improved dropped from 95% to 72.6%; in Grant County, from 90% to 76.6%; and in Owen County, from 74.5% to 63.7%. These are three typical Eden Shale Belt counties. No county in the Eden Shale Belt showed a gain during this period. This decrease in the percentage of land in farms improved will continue for some time as fields damaged by erosion pass out of agricultural use and revert to forest. There are at present few slopes to clear to offset this loss, consequently it will be increasingly greater for a number of years, but thereafter, losses will become smaller until a final condition of equilibrium is reached, after which the percentage of land in farms improved will remain approximately constant.

The rise of land prices in Kentucky has been similar to that in other portions of the United States, although not quite so marked. Between 1850 and 1890, the average price of farm land in Kentucky increased $10.17 per acre or 76%, but between 1900 and 1920, the increase amounted to $43.01 per acre or 247%. During the same period, in seven counties of the central Blue Grass, land increased $156.99 per acre in price, an increase of nearly 340%. (5) This rapid increase was occasioned by the increase in price of all agricultural commodities, but particularly by the high price of white burley tobacco.

The following tabulations indicate the great amount of land which was transferred during the period of agricultural

boom, the average selling price of the land, and the range in price per acre of farm land in seven of the better agricultural counties of the Blue Grass. The value per acre also roughly reflects the relative desirability of the average farm of each of these seven counties.

NUMBER OF FARM SALES

Counties	1918	1919	1920
Bourbon	243	257	306
Clark	258	285	458
Fayette	312	440	525
Jessamine	196	149	200
Madison	461	378	545
Scott	337	383	402
Woodford	179	326	353
Total	1,986	2,218	2,789

Data from offices of county clerks of the seven counties.
(Data from Bull. No. 240, Ky. Agr. Exp. Station.)

AVERAGE SELLING PRICE OF FARM LAND WITH IMPROVEMENTS. TOTAL OF 930 SALES

County	1917		1918		1919		1920	
	No. of Records	Value Per Acre	No. of Records	Value Per Acre	No. of Records	Value Per Acre	No. of Records	Value Per Acre
Bourbon	15	$163.35	26	$180.90	44	$250.15	42	$332.28
Clark	1	112.42	7	178.19	40	267.14	52	272.45
Fayette	11	195.50	47	199.50	139	306.75	48	380.00
Jessamine	4	120.30	11	152.35	43	242.41	66	244.46
Madison	2	149.68	14	122.00	32	143.79	42	176.86
Scott	2	167.91	30	162.18	42	248.95	28	245.64
Woodford	3	164.92	17	192.50	47	222.09	75	251.08
Average value	38	$170.50	152	$188.60	387	$261.50	353	$288.60
Per cent of increase over 1917 prices				10.6%		53.3%		69.2%

(Data from Bull. No. 240, Ky. Agr. Exp. Station.)

RANGE IN PRICE PER ACRE OF FARM LAND

Value Per Acre	1918		1919		1920	
	No. of Farms	Per Cent of Farms	No. of Farms	Per Cent of Farms	No. of Farms	Per Cent of Farms
Under $100	18	12.0	18	4.8	15	4.2
$100—under $200	67	44.7	64	17.2	69	19.2
$200—under $300	46	30.7	135	36.2	101	28.2
$300—under $400	17	11.3	91	24.4	87	24.2
$400—under $500	2	1.3	36	9.7	53	14.8
$500—under $600			14	3.8	18	5.0
$600—under $700			9	2.4	10	2.8
$700—under $800			2	.5	3	.8
$800 and over			4	1.0	3	.8
Totals	150	100.0	373	100.0	359	100.0

(Data from Bull. No. 240, Ky. Agr. Exp. Station.)

Not only did land prices increase in the Inner Blue Grass, but corresponding increases occurred in the Eden Shale Belt and in the Outer Blue Grass as well. In the Eden Shale Belt, the percentage increase in land price between 1910-1920 was frequently as great as in the areas of more agricultural promise, the Inner and Outer Blue Grass, though the actual increase per acre expressed in dollars was less. The explanation commonly advanced to account for the great increase in the price of land which occurred between 1910 and 1920 is that the high price of farm products, and particularly of tobacco, justified the high prices paid. Cash and share rentals from farms during this period warranted this assumption as the average rate of return on the high priced land was satisfactory. Agriculture, however, during this period was exceptionally profitable so that when profits for the period were used as a basis for determining land values, overpricing of the land occurred.

RATES OF INTEREST RECEIVED ON CAPITAL INVESTED IN FARMS—1919

Interest on Capital	Share 1919				Cash 1919			
	No.	Av. Rent	Av. Net Rent Per Acre	Av. Rate Per Cent	No.	Av. Rent	Av. Net Rent Per Acre	Av. Rate Per Cent
Under 3 per cent	3	$1,400	$3.23	1.18	13	$1,376	$5.69	2.29
3 per cent—under 6	6	2,503	13.05	3.60	20	3,909	9.04	4.08
6 per cent—under 9	21	7,195	21.16	7.8	8	5,602	19.59	7.82
9 per cent—under 12	21	5,977	22.55	10.02				
12 per cent—under 15	10	7,734	35.15	13.65	1	2.500	31.25	12.5
15 per cent—under 18	8	7,213	31.91	15.65	1	1,311	45.70	15.9
18 per cent—under 21	4	3,421	39.32	19.45				
21 per cent—under 24	3	3,843	26.87	22.66				
Over 24 per cent	4	7,331	15.00	35.17				
Totals	80	$6,088	$22.55	9.44	45	$3,250	$10.31	4.42

(Data from Bull. No. 240, Ky. Agr. Exp. Station.)

The increase in the price of white burley tobacco was the most outstanding of the price increases for the agricultural products of the area. In 1913, white burley tobacco brought 12.315 cents per pound; in 1919, the average price was 45.48 cents per pound, an increase of 269%. Production costs did not increase correspondingly, hence profits in growing tobacco were great and land prices increased to correspond.

LAND VALUES PER ACRE—1900-1920

Percentage of Increase in Values by Decades

Counties	1900	1910	1920	1900-10 %	1910-20 %	Actual Increase 1900-20
Anderson	$12.37	$22.07	$62.06	78	181	$39.99
Boone	29.60	36.91	64.65	24	75	27.74
Bourbon	60.10	88.94	236.14	48	165	147.20
Boyle	33.64	55.83	121.36	65	117	65.53
Bracken	22.86	32.25	76.94	41	138	44.69
Campbell	34.28	38.56	56.02	12	47	17.46
Carroll	20.92	30.99	57.57	48	85	26.58
Clark	42.18	69.40	147.82	64	113	78.42

LAND VALUES PER ACRE—1900-1920—Cont'd

Counties	1900	1910	1920	1900-10 %	1910-20 %	Actual Increase 1900-20
Fayette	67.26	106.98	257.00	59	140	150.02
Franklin	21.72	33.11	78.53	52	137	45.42
Gallatin	20.22	26.50	53.15	31	100	26.65
Garrard	21.91	50.84	121.18	132	138	70.34
Grant	18.88	25.71	52.91	36	105	27.20
Harrison	23.61	44.60	115.80	88	159	71.20
Henry	22.32	37.09	85.15	66	129	48.06
Jessamine	39.60	68.03	170.68	74	150	102.65
Kenton	34.60	38.10	74.18	10	94	34.08
Madison	23.20	41.62	95.09	79	128	53.47
Mason	43.92	62.30	125.46	41	101	63.16
Mercer	23.44	41.94	101.37	78	141	60.43
Montgomery	34.28	56.77	140.26	65	147	83.49
Nicholas	27.00	50.89	120.92	88	137	70.03
Owen	21.49	21.98	48.28	2	119	26.30
Pendleton	16.67	19.92	56.29	18	182	36.37
Robertson	15.81	31.82	79.02	101	148	47.20
Scott	35.86	56.28	135.53	56	140	79.25
Shelby	30.54	50.75	123.83	65	144	73.18
Spencer	14.28	29.25	70.58	104	141	41.33
Washington	14.39	30.90	67.12	114	117	36.22
Woodford	45.74	75.24	180.60	64	140	105.36
Average for the Blue Grass	$29.08	$45.84	$105.84	57.6	130.8	
State average	$13.24	$21.83	$48.62	64	122	

(Data from U. S. Census.)

Factors other than the high prices for agricultural products which contributed in greater or lesser degree to the increase in the price of land were: (1) Inflation of the currency; (2) Land speculation; (3) The buying of land by individuals who had secured money elsewhere, as in Eastern Kentucky, with the opening up of oil and gas fields and coal lands. The people of the eastern counties of the state have always regarded the Blue Grass as a highly desirable area, hence with the acquisition of money, many invested in Blue Grass land.

With the collapse of the agricultural boom, purchasers of land at the peak of high prices became financially embarassed. It is estimated by bankers and others in a position to form an accurate estimate of the situation, that at least 50% of those who bought land just prior to 1920 are in financial difficulties, as well as approximately 90% of those who purchased in 1920. (6.)

In some cases, the purchasers, unable to meet the interest charges on the deferred payments, voluntarily deeded the farms back to the original owners. Often an extension of time was allowed on the deferred payments in case the interest payments were met. A few purchasers endeavored to sell their farms to meet their financial obligations, but such sales generally failed to raise enough to liquidate the indebtedness.

Several years will probably elapse before it is possible to evaluate fully the results of the land boom. Whether the majority of the farmers will be able to pay off their indebtedness will depend largely upon the prices which agricultural products bring during the next few years. At present, however, the area is experiencing the bad effects of the inflation of land prices which resulted in major part from a belief in the permanancy of high prices for the agricultural products of the area.

Tenancy

In 1900 and prior to that date, tenancy in the Blue Grass did not exceed the state average appreciably, but since then, tenancy has increased rapidly, especially in the better agricultural areas. In 1920, the average for the Blue Grass was 40.4% as against a state average of 33.4%. This is what would normally be expected in view of the high agricultural desirability of the Blue Grass.

Many of the tenants in the Blue Grass are "croppers," agricultural laborers who receive as their pay a portion of the tobacco crop. The cropper is not necessarily resident on the land which he works. The great increase in the area given over to tobacco has resulted in the rapid increase in tenancy shown in census statistics.

OWNERSHIP OF THE LAND

Number of Farms Worked by Tenants

Counties	1900	1910	1920
Anderson	266(21.2)	493	531(32.2)
Boone	467(29.8)	523	742(40.5)
Bourbon	596(44.2)	670	1,074(56.9)
Boyle	221(25.2)	308	544(39.0)
Bracken	699(40.8)	836	770(42.5)
Campbell	438(27.0)	351	300(21.1)
Carroll	650(51.8)	599	568(52.3)
Clark	402(29.2)	573	703(42.5)
Fayette	554(40.3)	660	1,073(54.2)
Franklin	601(36.0)	626	812(43.2)
Gallatin	354(44.4)	352	351(43.8)
Garrard	329(25.1)	626	660(34.2)
Grant	658(32.0)	504	672(32.4)
Harrison	816(33.2)	1,011	949(39.2)
Henry	892(41.9)	1,056	1,180(45.8)
Jessamine	283(28.7)	483	770(50.2)
Kenton	417(30.0)	293	352(26.4)
Madison	694(25.2)	1,437	1,274(35.8)
Mason	586(37.2)	627	1,141(52.1)
Mercer	380(23.9)	378	637(30.8)
Montgomery	384(31.4)	496	480(32.5)
Nicholas	472(28.8)	606	807(42.4)
Owen	1,077(38.9)	1,118	1,102(40.3)
Pendleton	822(33.1)	685	724(31.1)
Robertson	350(35.7)	314	385(38.8)
Scott	824(42.8)	815	891(40.8)
Shelby	576(28.8)	864	1,245(46.0)
Spencer	388(35.8)	574	727(47.9)
Washington	469(22.8)	404	710(28.4)
Woodford	510(48.4)	601	775(57.4)
Totals	16,175(33.5)	18,883	22,949(40.7)
Percentage of farms in Blue Grass	33.5%	36.2%	40.7%
Average percentage for the State	32.8%	33.9%	33.4%

Numbers in parenthesis indicate the percentage of the total number of farms operated by tenants.

(Data from U. S. Census.)

As a class, tenants are not becoming land owning farmers to any considerable extent. This is in part a result of the high prices land commands which does not make the acquisition of a farm a possibility without considerable capital. Since the collapse of the land boom, the low prices for tobacco and other agricultural products have also had a deterrent effect upon the acquisition of farms by tenants, as the rental on the land is less than the interest charge which would be incurred by borrowing money to purchase.

The rate of increase in tenancy has been far from uniform in the three sub-regions of the Blue Grass. In the Eden Shale Belt, the number of tentants has increased little if any during the past two decades and the actual percentage of tenancy has also remained almost stationary during the same period in practically all the counties of this sub-region. In Pendleton County, for example, tenants have decreased in number and the percentage of tenancy has also decreased, dropping from 33.1% to 31.1%, between 1900 and 1920. In other typical counties in the Eden Shale Belt, as Owen and Grant counties, both the number of tenants and the percentage of tenancy have changed but little during the two decades terminating in 1920. Decreasing productivity resulting from the cultivation of too steep slopes has led to this condition in the Eden Shale Belt. Tobacco is one of the principal crops raised by tenant farmers, as it gives a high money return per acre and is a cash crop, but inasmuch as it is a crop involving clean cultivation and is very exhausting to the soil, its excessive cultivation in the hilly Eden Shale Belt adds rapidly to the area of abandoned fields. Indications are that a decrease in tenancy will occur as soil erosion causes still further abandonment of the steeper slopes to forest growth.

In the counties of the Outer Blue Grass, both the number of tenants and the percentage of tenancy increased steadily during the two decades ending in 1920. In Shelby County, which is typical of this sub-region, tenants more than doubled in numbers and tenancy increased 17.4%. Similar, though smaller increases in both the number of tenants and the percentage of tenancy, occurred in the other counties of the Outer Blue Grass. Topographic and soil conditions in this sub-region

are such that a continuance of the tenant cropping system is an economic possibility, therefore a high percentage of tenancy will continue and some increase in tenancy may be expected.

It is in the Inner Blue Grass, however, that tenancy has made the most rapid progress, the increases of this area, together with the somewhat smaller ones of the Outer Blue Grass, offsetting any losses in the Eden Shale Belt and causing the great increase previously noted for the Blue Grass as a whole. In Fayette, Jessamine and Woodford counties, representative Inner Blue Grass counties, tenants practically doubled in number between 1900 and 1920 and the percentage increase was also very great, in Jessamine County reaching 21.5%. In this area, as in the Outer Blue Grass, fertile soils and gently rolling topography create conditions favorable for the development of tenancy, hence a continuation of a high percentage of tenancy may be expected for the future.

Crop Production

In marked contrast to conditions in many other portions of Kentucky, the permanence of agriculture and the continued productivity of the land are salient characteristics of the Blue Grass. Only in the Eden Shale Belt has the use of the land varied considerably over relatively short periods of time. In both the Inner and Outer Blue Grass, except in very limited areas of thin soils usually occuring in the more dissected portions adjoining the larger stream courses, the land has been used in crop production for many decades, cereals and tobacco alternating with pasture without apparent depletion of soil fertility or without the development of excessive slope wash. In the Eden Shale Belt, however, conditions are similar to those which exist in many other hilly portions of the state. Temporary agricultural use of slopes is followed by reversion to forest as erosion removes the thin soil cover and makes the area unsuitable for the production of crops. The consequence of this clearing and subsequent abandonment of fields as they pass out of use with the removal of soil by slope wash is that the changing boundary of farmed land and forest so characteristic in eastern Kentucky is duplicated in this area. Along the

creeks, farms are linear in character with changing boundaries; on the ridgetops, they are likewise fringed by the encroaching forest which repossesses the abandoned fields.

In both the Inner and Outer Blue Grass, the percentage of the improved land in crops, as listed in census returns, presents an essentally correct picture of conditions. In the Eden Shale Belt, however, a somewhat larger fraction of the land, which may properly be classed as improved, is in crops than is shown by census returns, as abandoned fields which may afford scanty pasture, while in the process of reversion to forest, are listed as improved land until the forest takes possession fully.

By contrast with many other portions of Kentucky, the Blue Grass is a commercial producer of agricultural commodities, particularly tobacco and animal products, the latter industry being based upon excellent pasturage and a surplus production of corn on farms which contain a larger acreage of cultivable and improved land than in those areas in which self sufficiency is the major objective in rural economy. Contributing to the position which the Blue Grass occupies as a commercial producer are the location of the area, its ease of accessibility by rail from important consuming areas and the excellent internal communication enjoyed on account of the many miles of fine limestone pikes and paved highways. This and the other conditions enumerated above are in turn related to and in part the result of favorable topographic conditions.

Soils vary from the fertile chocolate colored silt loams of most portions of the Inner Blue Grass to the stony clays, relatively infertile and yellow in color, of the Eden Shale Belt; and considerable areas of fertile alluvium border the courses of the larger streams. In spite of this rather wide variation in soils, the major crops are confined neither to definite soil types nor to any particular type of topography. (See Pls. IX, XXII, XXIV, and XXV). The more level areas tend to greater permanence of agricultural use and the more fertile soils yield more abundantly, but the same major crops are raised throughout the Blue Grass. Differences in agricultural practice and results are confined to an occasional change in the minor crops and the relative position which a given crop occupies in the farm economy, together with variation in yield. Steep

slopes tend to eliminate the small grains, which are minor crops, but it is topography rather than the physical character or the chemical composition of the soil which thus restricts the use of the land and alters the cropping practice.

Temperature conditions are sufficiently uniform so that only minor differences in the agricultural economy result therefrom. All portions of the Blue Grass have a normal growing season of at least 180 days, (7) which is a period of sufficient length to insure satisfactory maturing of the crops grown in the area, except in limited sections of deficient air drainage. In general, the risk of destruction of crops by frost is less in Kentucky than in states further north and south (8). This results from the fact that the growing season is of sufficient length so that it is possible to plant the staple crops after the danger from spring frosts has passed and these crops mature or are harvested before the killing frosts of the fall. In occasional years, favorable springs induce early planting or late springs may delay planting so that the risk of damage by frost is increased, but this is not a common occurrence. Crops normally mature long before the first frosts in the fall so that the stimulus of approaching cold weather is lost, though it is probable that the dry weather which prevails in the late summer and early fall has the same effect upon fruiting habits and crop yields as does the cold of higher latitudes.

Summer days are hot, temperatures of 108° being known and days are generally clear during the late growing and fruiting season. Prolonged cold weather is uncommon, though minimum temperatures 28° below 0° occasionally occur.

Warm, moisture laden winds, prevailingly from the south and southwest, bring from 42 to 60 inches of rainfall which is usually well distributed throughout the year. The maximum precipitation normally occurs during the growing season of spring and early summer; the minimum usually occurs during the fruiting and harvesting season in the early fall. (9) This distribution of maximum and minimum precipitation is extremely favorable for agriculture. Snow comprises only a small fraction of the precipitation, on an average less than 5% of the total, a very small amount. As few crops are fall planted, winter snow is relatively unimportant except as absorbed by the soil and stored up for the use of plants during the growing season.

Winds of destructive violence are infrequent and crops are seldom damaged or yields decreased from that cause.

The highly fertile soils which are characteristic over the larger fraction of the Blue Grass, the abundant and well distributed precipitation, the high relative humidity, and the general freedom from destructive frosts and violent winds are all important factors in explaining the position which agriculture occupies in the Blue Grass.

Cereals

Corn is the most important cereal crop in the Blue Grass, being grown much more extensively than the small grains such as wheat, oats, rye, and barley. In 1919, corn constituted 78% of the total cereal crop expressed in bushels. Although corn occupies such an important position in the agricultural economy of the Blue Grass, it comprises a somewhat smaller percentage of the total cereal production of the area than for that of the state as a whole and it is a much less important crop relative to total production than in eastern Kentucky or other portions of the state of comparable topographic conditions.

Within the Blue Grass, the relative importance of corn among the cereal crops varies considerably. In both the Inner and Outer Blue Grass, the small grains occupy a more important position than they do in the Eden Shale Belt. In a typical Inner Blue Grass county such as Fayette, corn constituted only 71% of the total 1919 cereal production expressed in bushels whereas in Owen, Grant and Pendleton counties, which lie in major portion of the Eden Shale Belt, corn accounted for 84%, 81% and 82% respectively of the cereal crops of those counties in 1919. This difference in the relative importance of the corn crop is related to topographic conditions, the steeper slopes of the Eden Shale Belt not being suited to small grain production although corn can be grown on such slopes during their period of use in crop production.

The important place which corn holds in the agricultural economy of the Blue Grass and the consequent growth of the crop under a considerable variety of topographic and soil con-

ditions results in appreciable differences in yields in the sub-regions. These differences appear in the following tabulation of yields for typical counties in each of the three sub-regions of the Blue Grass and are shown graphically in Fig. 4.

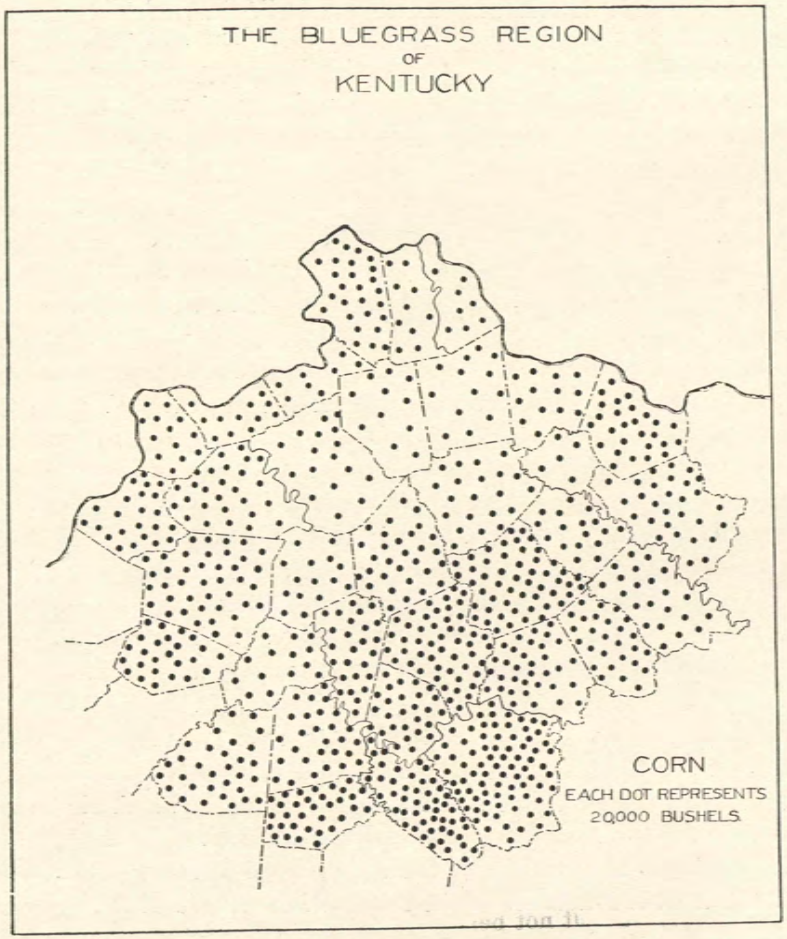

Fig. 4. Distribution of Corn in the Blue Grass.

In the Eden Shale Belt, corn is grown on the level ridge tops, on the bottoms which flank the larger streams (See Pl. VIII), and on hillsides which are in temporary agricultural use. (See Pls. VII and IX.) In none of these areas, except on the bottoms, are soils good and on the hillsides they are not

only infertile but often thin as well. In consequence, yields in this sub-region are poor and slightly below the state average (22.2 bushels per acre in 1919) and much below the average for

CORN PRODUCTION—1919
In Typical Counties of the Three Sub-regions of the Blue Grass

Counties	Acreage in Corn	Total Crop in Bushels	Yield Per Acre in Bushels	Yield Per Sq. Mi. of Land Surface in Bushels
Typical Inner Blue Grass Counties				
Fayette	25,386	944,667	37.2	3,511.7
Jessamine	16,791	538,864	32.0	3,132.9
Woodford	15,744	516,499	32.8	2,648.7
Typical Eden Shale Belt Counties				
Grant	12,726	227,676	17.8	862.4
Owen	16,989	352,848	20.7	961.4
Pendleton	14,858	255,679	17.2	916.4
Typical Outer Blue Grass Counties				
Henry	20,608	563,302	27.3	1,869.0
Shelby	32,246	831,276	25.7	1,946.7
Madison	48,122	1,592,904	33.1	3,571.9

(Data from U. S. Census.)

the Blue Grass. Typical counties in the Eden Shale Belt show average yields only slightly in excess of 50% of the average yields for the Inner Blue Grass where both topographic conditions and fertile soils insure good crops of corn. Yields of corn in the Outer Blue Grass almost equal those of the area ot outcrop of Lexington and Cynthiana limestones, the Inner Blue Grass.

Corn justifies itself as a crop on the basis of yields in most portions of the Blue Grass, though it is true to some extent in this area as elsewhere in Kentucky that inherited traditions of agriculture are in part responsible for the important position which corn holds in the cropping system. This is especially noticeable in the more hilly portions of the Eden Shale Belt where the preservation of pioneer conditions is most marked.

CORN PRODUCTION IN THE BLUE GRASS

Counties	Total Cereal Production in Bushels, 1919	Total Production of Corn in Bushels		Corn			
				Bushels Per Sq. Mi. of Land Surface		Bushels Per Sq. Mi. of Improved Land	
		1919	1909	1919	1909	1919	1909
Anderson	353,502	280,431	375,923	1,395.1	1,870.2	1,947.3	2,610.5
Boone	634,397	547,941	638,987	2,183.0	2,545.7	2,739.7	3,117.0
Bourbon	1,302,922	1,037,028	1,202,542	3,411.2	3,955.7	3,898.6	4,234.3
Boyle	902,231	653,191	768,734	3,511.7	4,132.9	4,802.8	5,694.3
Bracken	505,859	253,342	397,540	1,241.8	1,948.7	1,849.2	2,184.2
Campbell	225,093	151,731	265,032	1,046.4	1,827.9	1,502.2	2,190.3
Carroll	279,095	242,379	316,805	1,836.2	2,400.0	2,606.2	3,075.7
Clark	790,397	669,791	842,710	2,527.5	3,180.0	3,299.4	3,956.3
Fayette	1,323,616	944,667	1,227,357	3,511.7	4,562.6	3,919.8	5,113.9
Franklin	424,690	307,830	512,012	1,546.8	2,572.9	1,960.7	3,084.4
Gallatin	170,089	148,107	233,178	1,358.7	2,139.2	1,683.0	2,878.7
Garrard	1,150,031	993,230	948,368	4,190.8	4,001.5	5,708.2	5,450.3
Grant	278,332	227,676	621,556	862.4	2,354.3	1,217.5	2,904.4
Harrison	532,728	397,014	911,932	1,276.5	2,932.2	1,881.1	3,328.2
Henry	727,945	563,302	703,123	1,869.0	2,320.5	2,318.1	2,905.4
Jessamine	815,871	538,864	640,611	3,132.9	3,724.4	3,904.8	5,383.2
Kenton	228,519	196,637	303,126	1,206.1	1,859.6	1,944.9	2,590.8
Madison	1,773,807	1,592,904	1,539,385	3,571.9	3,429.1	4,590.5	4,448.8
Mason	691,460	524,054	1,024,161	2,308.6	4,511.7	2,568.8	4,741.4
Mercer	792,607	556,441	786,739	2,199.3	3,109.6	2,714.3	3,993.5
Montgomery	633,726	548,185	585,638	2,768.6	2,957.7	3,630.3	4,011.1
Nicholas	416,386	340,011	557,546	1,634.6	2,680.5	2,125.0	3,620.4
Owen	419,927	352,848	723,139	961.4	1,970.4	1,341.6	2,485.0
Pendleton	312,521	255,679	588,755	916.4	2,110.2	1,304.4	2,442.9
Robertson	124,718	108,028	236,653	991.0	2,171.1	1,479.7	2,751.7
Scott	830,856	605,402	912,229	2,094.8	3,156.5	2,512.0	3,119.3
Shelby	1,127,911	831,276	1,133,855	1,946.7	2,655.4	2,534.3	3,354.5
Spencer	584,177	491,037	500,924	2,639.9	2,639.1	3,532.6	3,527.6
Washington	814,112	585,140	751,900	1,956.9	2,514.7	2,635.7	3,172.5
Woodford	787,696	516,499	690,034	2.648.7	3,538.6	3,332.2	4,156.8
Average or total for Blue Grass	19,755,301	15,460,665	20,940,488	2,147.0	2,923.0	2,807.0	3,580.0
Average or total for the State	85,139,957	71,518,444	83,348,024	2,369.0	2,761.0	3,275.0	3,716.0

(Data from U. S. Census.)

In these hilly counties, the fact that corn gives maximum yields with careless cultivation, together with the general utility of the grain and its ease of storage, have had a very definite effect in determining the position of corn in the agricultural economy.

In the Blue Grass, optimum climatic conditions for small grain production do not exist, whereas corn grows luxuriantly and yields abundantly wherever soils are good and topographic conditions allow agriculture.

Corn will continue to be the most important cereal crop in the Blue Grass, but the relative position which it occupies in the economy of the area and the relative production of the various sub-regions have been changing during the past two decades and further changes will occur. In both the Inner and Outer Blue Grass, where the permanancy of agriculture in the areas under cultivation is assured by climate, topography and fertile soils, neither the acreage in corn nor the total yields have varied in a startling manner, but in the Eden Shale Belt, total yields have dropped over 50% during the past twenty years. This has resulted from a decrease in the area of improved land, decreased yields with lessening of soil fertility, and increased emphasis on other crops, particularly tobacco. The most significant cause for the decrease, which seems to be permanent, is the decrease in the area of land susceptible of cultivation with profit.

None of the small grains occupies an important position in the farm economy of the Blue Grass. The lesser labor requirement of wheat, oats, rye, and barley is not a factor in enabling them to replace corn in view of the favorable climatic conditions for the growth of corn and its greater per acre yield. The small grains are grown, not because of the direct financial return which may be secured by their cultivation, but as a part of a crop rotation or to enable the farmer to distribute his work advantageously. In some cases, the small grains, and this is particularly true of wheat and oats, may be grown in an attempt at self sufficiency on the part of the farmer.

Of the small grains, wheat is produced in greatest volume, normally comprising approximately 75% of the total small

grain production of the area. The wheat acreage is distributed rather unevenly and yields also vary greatly as shown in the accompanying tabulation. In areas of favorable topography

WHEAT PRODUCTION—1919, IN TYPICAL COUNTIES OF THE THREE SUB-REGIONS OF THE BLUE GRASS

	Acreage in Wheat	Total Crop in Bushels	Yield Per Acre in Bushels	Yield Per Sq. Mi. of Land Surface, Bushels
Typical Inner Blue Grass Counties				
Fayette	20,074	330,391	16.4	1,228.2
Jessamine	15,361	245,508	15.9	1,427.3
Woodford	14,525	219,413	15.1	1,125.1
Typical Eden Shale Belt Counties				
Grant	2,903	37,761	13.0	143.0
Owen	3,854	45,781	11.8	124.4
Pendleton	3,028	36,800	12.1	131.9
Typical Outer Blue Grass Counties				
Henry	6,383	122,566	19.2	404.5
Shelby	20,887	250,744	12.0	587.2
Madison	10,536	141,046	13.3	316.2

(Data from U. S. Census.)

and diversified farming, as the Inner and Outer Blue Grass, wheat is grown and used locally, but in the hilly Eden Shale Belt, yields are low and it becomes unimportant as a crop.

Next in importance among the minor cereals is the oats crop, which comprises approximately 20% of the total small grain production. Climatic conditions are not favorable for growing oats, and in the Eden Shale Belt, topography also imposes a handicap on production. In spite of these facts, crop rotations and the use of oats as stock feed induce the growing of limited acreages of this cereal. Yields per acre are low, this being particularly true in the Eden Shale Belt counties where yields per square mile of land surface are also lowest. The decrease in the fruiting habit, associated with production on the southern margin of the area of commercial production, insures the oats crop a subordinate position in the cropping system for the future, comparable to that which it possesses today.

OATS PRODUCTION—1919, IN TYPICAL COUNTIES IN THE THREE SUB-REGIONS OF THE BLUE GRASS

	Acreage in Oats	Total Crop in Bushels	Yield Per Acre in Bushels	Yield Per Sq. Mi. of Land Surface, Bushels
Typical Inner Blue Grass Counties				
Fayette	1,056	20,913	19.8	77.7
Jessamine	1,004	19,122	19.0	111.1
Woodford	320	7,650	23.9	39.2
Typical Eden Shale Belt Counties				
Grant	638	8,057	12.6	30.5
Owen	1,234	17,547	14.2	47.8
Pendleton	850	12,066	14.1	43.2
Typical Outer Blue Grass Counties				
Henry	1,637	23,933	14.6	78.9
Madison	1,658	29,326	17.6	65.7
Shelby	2,107	31,124	14.7	72.8

(Data from U. S. Census.)

Rye and barley are minor cereal crops, the total combined annual production for the Blue Grass being normally less than 300,000 bushels (271,933 bu. in 1909 and 279,440 bu. in 1919). Of this amount, rye comprises from 65% to 80% of the total. Although the total for the two cereals has changed but little during the past twenty years, the barley crop is increasing and the rye crop is decreasing in importance, though still more important than barley in most counties. Barley is most important as a crop in the Inner Blue Grass, Woodford County alone accounting for 38% of the total 1919 crop of the Blue Grass and Fayette County for 18%. The Inner Blue Grass produces approximately 80% of the total Blue Grass production of barley and the amount is increasing. The balance is raised almost entirely in the Outer Blue Grass, the Eden Shale Belt production of barley being negligible.

Rye is raised in every Blue Grass county, though production is relatively more important in the Outer Blue Grass and the Eden Shale Belt than in the Inner Blue Grass. Eighteen of the thirty Blue Grass counties showed a decline in rye production for the decade ending in 1920, practically all of the Inner Blue Grass counties participating in this decline. The accompanying tabulation shows the approximate relative importance of rye and barley in the sub-regions of the Blue Grass. The production of other small grains such as buckwheat is negligible.

BARLEY AND RYE PRODUCTION—1919, IN TYPICAL COUNTIES OF THE THREE SUB-REGIONS OF THE BLUE GRASS

	Total Rye Crop in Bus.	Rye Crop Per Sq. Mi. of Land Surface in Bushels	Total Barley Crop in Bushels	Barley Crop in Sq. Mi. of Land Surface in Bushels
Typical Inner Blue Grass Counties				
Fayette	5,534	24.9	19,111	74.7
Jessamine	5,231	30.4	7,106	41.3
Woodford	3,908	20.0	40,186	206.0
Typical Eden Shale Belt Counties				
Grant	4,813	18.2	None reported	
Owen	3,558	9.6	193	0.5
Pendleton	7,792	27.8	184	0.6
Typical Outer Blue Grass Counties				
Henry	18,024	59.4	120	0.4
Shelby	12,815	30.0	1,569	36.7
Madison	8,497	19.5	1,814	4.0

(Data from U. S. Census.)

Textile Fibers

Hemp was first grown in the Blue Grass near Danville about 1775 (10) and it has been raised on the alluvial soils and the silt loams of the Inner Blue Grass in varying amounts from that date down to the present. The peak of production was apparently reached about 1868; since that time production has declined to such an extent that hemp was not listed among the crops of Kentucky in the Fourteenth Census. At the present time, the crop is of very minor significance, its inclusion in this discussion of the crops of the area being prompted, not by its

present importance, but by its past significance in the agricultural economy of the Blue Grass and its effect in locating industries which still persist, though supplies of hemp for these industries are today obtained in larger part from areas outside of Kentucky.

Hemp growing in the Blue Grass has declined because the dark color resulting from over-retting, the coarse fiber, the excess of dirt, and the uneven quality of Kentucky hemp resulting from preparation of the fiber by hand labor, have not allowed the product to compete successfully with fibers produced elsewhere and handled by machinery. Tobacco growing, however, has been successful with the type of labor available and without the introduction of machinery, hence tobacco has replaced hemp as the cash crop on land where hemp was formerly grown, particularly in the Inner Blue Grass. Yields of hemp average over 1,000 pounds of fiber per acre, and when handled properly, it is one of the most profitable crops suited to the Blue Grass. In view of conditions in the area as regards the character of the labor supply, together with the generally profitable character of tobacco production, however, it is doubtful whether hemp will regain the important position it formerly held.

Hay and Forage Crops

One of the outstanding characteristics of the Blue Grass which sets the area apart from other portions of Kentucky is the fact that fields out of use in the production of cultivated crops, are seeded and grass over the year following cropping of the land, this being true for all portions, though less so for the Eden Shale Belt than for the other sub-regions. In many portions of the state, the absence of pasture grasses suited to the soils results in the capture of fields not in use in crop production by sprouts and weeds, which causes the farms to present a very neglected, unattractive appearance. In both the Inner and Outer Blue Grass, the pastures, with their flocks of sheep or herds of cattle, create an impression of the agricultural area quite the reverse of that produced by the unused fields in the areas where sprouts and weeds take possession.

In addition to the large acreage in pastures, the Blue Grass leads all portions of the state in the production of hay crops, both in the amount of land devoted to their production and in the yield per acre. Although areally only 17.9% of the

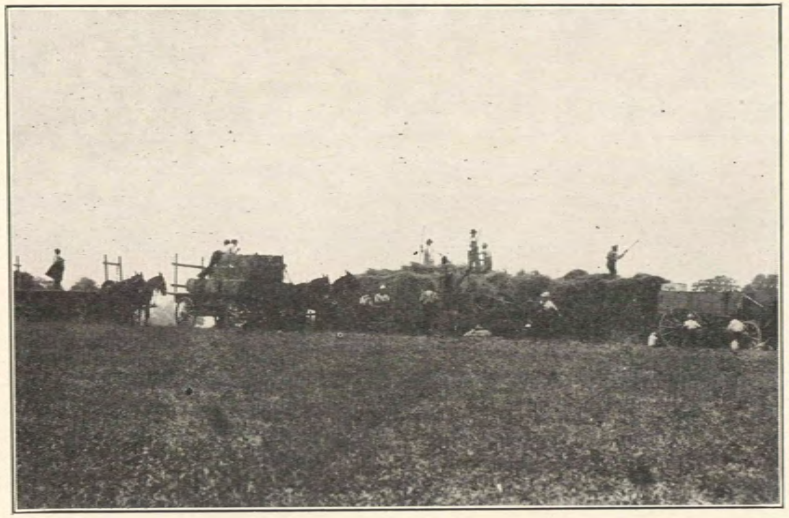

Plate XX. Baling hay in the Inner Blue Grass. Franklin County on the road to Versailles.

state, the Blue Grass had 19.5 the acreage in clover, 76.5% of the acreage in alfalfa, and 27.9% of the acreage in all tame hay crops for the state in 1919. Of the area in small grains cut for forage, annual legumes, silage crops, corn for forage, kaffir, sorghum, and root crops for forage, the Blue Grass had 19.9% of the state total for 1919, but of the wild hay acreage only 1.3%.

Production figures are correspondingly high for the area, as the fertile soils derived from limestones of high phosphatic content yield abundantly. The average production for the entire Blue Grass in tons per acre in 1919 for all tame grasses was 1.09 tons as against a state average of 1.03 tons. In the Inner Blue Grass counties, Fayette, Jessamine and Woodford, yields were 1.14 tons, 1.30 tons, and 1.24 tons per acre respectively in 1919 and yields were almost equally good in the same year in the Outer Blue Grass. Even typical Eden Shale Belt counties as Grant, Owen and Pendleton had yields of 1.09 tons, 1.01 tons and 1.19 tons per acre respectively in 1919. The

average of the yields, even for this poorer section of the Blue Grass, were slightly above the average for the state.

The relative importance of the pasturage in the sub-regions cannot be judged accurately by the relative number of

HAY AND FORAGE CROPS—1919

Counties	Clover Acres	Alfalfa Acres	All Tame Grasses Acres	All Tame Grasses Tons	Wild Grasses Acres	Total Hay Crops Acres
Anderson	836	630	8,076	7,278	8	15,075
Boone	527	1,102	12,732	15,608	.....	18,681
Bourbon	758	183	8,436	9,379	.....	18,914
Boyle	747	124	5,557	6,698	18	10,269
Bracken	53	2,735	9,583	8,914	.....	15,858
Campbell	540	10,335	14,043	17,216	53	18,808
Carroll	326	1,167	4,923	5,877	.....	9,740
Clark	932	84	6,103	8,305	.....	20,178
Fayette	1,041	44	6,928	7,956	.....	11,600
Franklin	1,609	758	7,883	9,599	21	16,219
Gallatin	256	1,588	4,400	4,892	.....	10,364
Garrard	558	.....	4,028	4,141	1	10,335
Grant	342	3,852	11,874	12,988	.....	17,225
Harrison	423	1,972	12,146	12,406	.....	17,664
Henry	833	206	9,506	9,896	5	17,202
Jessamine	524	19	5,493	7,148	.....	11,413
Kenton	266	3,116	8,829	9,964	1	14,465
Madison	739	126	6,896	8,978	19	23,344
Mason	144	119	8,795	8,857	3	23,785
Mercer	2,493	989	8,836	8,881	241	21,682
Montgomery	432	53	5,719	5,335	18	14,249
Nicholas	413	168	6,463	5,785	.....	8,846
Owen	233	449	10,262	10,396	.....	16,811
Pendleton	336	11,495	17,111	20,376	.....	26,569
Robertson	18	568	2,416	2,264	.....	2,820
Scott	957	469	10,697	10,672	5	14,971
Shelby	1,683	114	16,406	16,487	.....	32,868
Spencer	521	41	7,020	6,453	.....	14,355
Washington	1,037	319	11,317	12,649	.....	18,859
Woodford	1,349	189	4,284	5,325	.....	11,454
Total for the Blue Grass	20,926	43,014	256,762	280,724	393	484,623
State total	107,266	56,211	917,720	950,800	22,310	2,084,909

(Data from U. S. Census.)

acres in hay crops nor by the amount of hay cut, which will vary with acreage, yield, and the amount of stock kept on the farms. Most of the hay grown is fed on the farms, especially in the counties where much stock is kept, though some is baled and sold as a cash crop. Plate XX shows a relatively common sight in the Inner Blue Grass.

The desirability of the Blue Grass for the production of forage crops is reflected in the name of the area and the fact that a native pasture grass of high desirability exists in the region has had much to do with the continued productivity of the land under use and the present cropping system and agricultural economy of the area.

In addition to the use of Blue Grass as a pasture grass and for hay, the growing of the crop for seed is an important industry in the many Blue Grass counties, though production declined from a maximum of 1,500,000 bushels of seed in 1912 1912 to 175,000 bushels in 1921.

Tobacco

"White Burley tobacco first made its appearance in the year 1864, near the village of Higginsport, Brown County, Ohio." (12) The new variety, which was a "sport" and originally considered valueless, rapidly gained favor with manufacturers due to its high absorptive qualities. This characteristic gave enormous impetus to its cultivation as the new variety was particularly valuable in the manufacture of plug tobacco, which at that time was in great demand. Accompanying increasing production in the area of Ohio in which it originated, it was introduced into Kentucky, where production increased until it is now the leading cash crop in the Blue Grass.

Burley tobacco is an air cured type and at the present time has a somewhat more diversified use than when first grown, being utilized in the production of plug-cut smoking tobaccos, in the manufacture of cigarettes, and to the lesser extent, in chewing tobaccos.

Kentucky produced one-third of the tobacco crop of the United States in 1919 and normally raises more than one-fifth of the crop of the world. The position which the state holds among the more important producing areas in the United States

is shown in the accompanying tabulation. It will be noted that although North Carolina led in acreage, Kentucky was distinctly in the lead in yield and in the value of the production.

TOBACCO—ACREAGE, PRODUCTION AND TOTAL FARM VALUE
1919

States	Acreage Acres	Production Pounds	Farm Values December 1
Kentucky	550,000	456,500,000	$174,383,000
North Carolina	554,000	310,240,000	166,289,000
Virginia	230,000	131,100,000	62,141,000
Tennessee	110,000	88,000,000	22,088,000
South Carolina	135,000	81,000,000	18,468,000
Ohio	90,000	77,400,000	26,084,000
Wisconsin	48,000	60,960,000	13,533,000
Pennsylvania	41,000	54,120,000	9,200,000
Connecticut	25,000	39,000,000	18,057,000
United States	1,901,200	1,389,458,000	542,547,000

(Data from U. S. Census.)

Of the total Kentucky production of 456,500,000 pounds of all types of tobacco in 1919, the Blue Grass produced 172,626,335 pounds or 37.7%. Not only does the area produce a large fraction of the state total but the production per square mile of improved land surface is also high, being 31,351 pounds for the Blue Grass as against a state average of 23,406 pounds in 1919.

Both total production and production per square mile of improved land surface increased greatly during the two decades ending in 1919 as a result of increased demand and the accompanying high prices. Although it would be possible to increase both acreage and yield in the Blue Grass, it is improbable that there will be any considerable permanent expansion of the area devoted to tobacco, both on account of the labor requirement of the crop and the fact that the law of diminishing returns will apply with decrease in fertility of the soil under excessive cropping in tobacco.

The accompanying tabulations show that maximum yields per acre are obtained in the Inner Blue Grass, minimum yields

TOBACCO PRODUCTION IN THE BLUE GRASS

Counties	Blue Grass Acreage, 1919	Yield Per Acre in Lbs., 1919	Total Production in Pounds			
			1919	1909	1899	1889
Typical Inner Blue Grass Cos.						
Fayette	15,667	1,107	17,358,339	7,155,087	6,339,690	2,638,272
Jessamine	6,304	878	5,538,779	3,559,594	2,020,550	1,501,762
Woodford	8,787	940	8,259,202	7,091,394	5,491,860	3,217,270
Typical Eden Shale Belt Cos.						
Grant	6,006	616	3,700,325	5,267,329	5,222,280	4,197,912
Owen	9,335	560	5,231,387	9,448,000	7,061,730	6,396,062
Pendleton	5,857	587	3,442,811	5,943,519	4,464,560	4,391,099
Typical Outer Blue Grass Cos.						
Henry	9,402	733	6,895,744	8,392,667	6,294,680	5,065,351
Madison	7,246	892	6,464,132	6,068,924	1,492,580	1,296,595
Shelby	12,022	816	9,813,187	9,314,692	6,465,370	3,767,586

(Data from U. S. Census.)

TOBACCO PRODUCTION IN THE BLUE GRASS

Pounds of Production Per Square Mile of Improved Land Surface

Counties	1919	1909	1899	1889
Typical Inner Blue Grass Counties				
Fayette	72,026	29,812	28,948	10,595
Jessamine	40,136	29,878	14,641	10,804
Woodford	53,285	42,719	34,540	21,306
Typical Eden Shale Belt Counties				
Grant	19,787	24,613	23,846	19,990
Owen	19,891	32,467	24,691	22,843
Pendleton	17,565	24,661	18,838	19,429
Typical Outer Blue Grass Counties				
Henry	28,377	34,680	26,011	21,927
Madison	18,628	17,540	4,169	3,893
Shelby	29,918	27,558	20,078	13,700

(Data from U. S. Census.)

in the Eden Shale Belt counties. The peak of production, both as to total production and production per square mile of improved land surface, was reached earlier in the Eden Shale Belt counties than in those of the Inner and Outer Blue Grass. Both

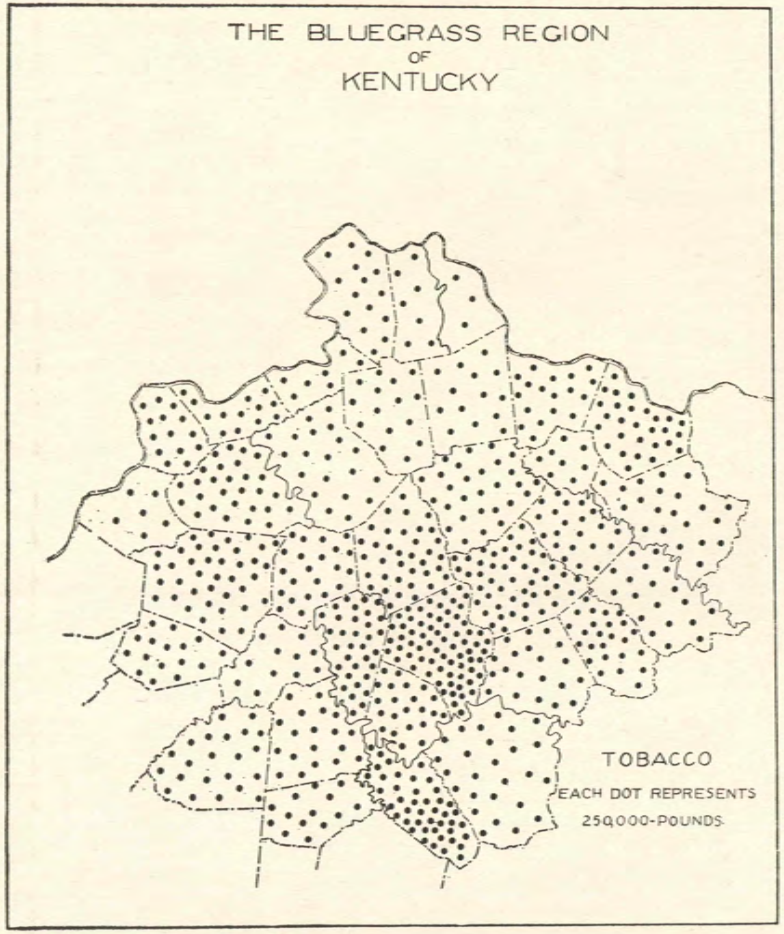

Fig. 5. Distribution of tobacco production in the Blue Grass.

the poor yield and the falling off of production in the Eden Shale Belt counties result from poor soils and unfavorable topographic conditions in the sub-region. (See Pls. VII, and XXII.) High prices for tobacco encouraged planting on slopes which have either decreased in productivity or passed out of agricultural use. (See Pls. XVI and XVIII.) The result has been a decrease in acreage, a decrease in yield per acre, and a decrease in production per square mile of improved land surface as shown in the accompanying tabulated statistics of tobacco

TOBACCO—POUNDS OF PRODUCTION PER SQUARE MILE OF IMPROVED LAND SURFACE

Counties	1919	1909	1899	1889
Anderson	20,612	15,950	8,568	4,660
Boone	18,686	17,258	13,207	17,263
Bourbon	44,967	31,971	29,908	18,768
Boyle	25,884	11,782	3,412	1,769
Bracken	33,460	35,634	34,596	29,941
Campbell	6,375	6,842	6,482	14,565
Carroll	33,763	34,542	30,389	33,817
Clark	25,234	24,191	23,681	15,472
Fayette	72,026	29,812	28,948	10,595
Franklin	32,387	25,584	15,887	18,765
Gallatin	19,321	24,329	25,115	24,062
Garrard	63,641	20,477	4,729	3,783
Grant	19,787	24,613	23,846	19,990
Harrison	34,369	29,300	23,762	16,300
Henry	28,377	34,680	26,011	21,927
Jessamine	40,136	29,878	14,641	10,804
Kenton	17,051	13,987	12,714	17,568
Madison	18,628	17,540	4,169	3,893
Mason	33,883	40,639	36,660	39,722
Mercer	22,851	14,444	5,560	7,292
Montgomery	40,979	32,423	24,415	21,826
Nicholas	32,947	36,188	26,241	22,136
Owen	19,891	32,467	24,691	22,843
Pendleton	17,565	24,661	18,838	19,429
Robertson	26,310	32,514	21,033	21,817
Scott	37,153	32,745	28,691	18,961
Shelby	29,918	27,558	20,078	13,700
Spencer	29,656	24,558	7,675	6,856
Washington	24,096	28,058	9,430	2,524
Woodford	53,285	42,719	34,540	21,306
Average for the Blue Grass	31,351	27,003	19,792	16,274
Average for the State	23,440.6	17,771.6	14,637	12,014

(Data from U. S. Census.)

production. In both the Inner and Outer Blue Grass, thicker, more fertile soils and more favorable topography have allowed expansion of the acreage and continuance of profitable yields.

Plate XXI. Cultivating tobacco. Inner Blue Grass. On Versailles Pike near Lexington, Fayette County.

Tobacco apparently gives most satisfactory yields on virgin soils and also does well on ground that has been in blue grass sod for several years. On such land, tobacco may follow tobacco for two years. The soil types on which tobacco is grown in the Blue Grass vary greatly in character and there is also a great deal of difference in topographic conditions in the three sub-regions, in all of which tobacco is the major cash crop.

In the Inner and Outer Blue Grass areas, where maximum yields are obtained, the land surface is level or undulating which permits the use of labor saving machinery. Typical conditions as to topography in the Inner and Outer Blue Grass counties are shown in Plates V, XII, and XXIV. The top soil of the Inner Blue Grass counties is either reddish brown or brownish yellow in color, from eight to twenty-four inches in depth, and is underlain by a brownish red clay. These soils are usually well drained. They are formed by the disintegration of a highly

phosphatic limestone and contains five to six times as much phosphorus as the soils of the balance of the state. (13) The same general conditions as to soils also exist in the Outer Blue Grass counties except that there is a somewhat smaller phos-- phorus content.

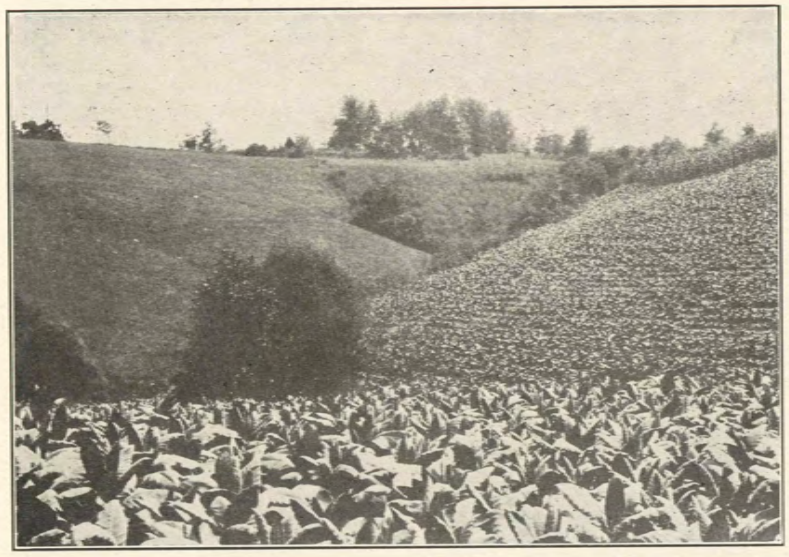

Plate XXII. Tobacco planted on a steep slope. Eden Shale Belt, West of Lawrenceburg, Anderson County.

In many of the tobacco fields of the Inner Blue Grass, there are numerous trees as shown in Plate XXI. Trees are generally lacking in the cultivated fields of the Outer Blue Grass though otherwise the appearance of the country is similar to that of the Inner Blue Grass.

In the Eden Shale Belt, the country is much rougher and tobacco is grown under more unfavorable topographic conditions. (See Plates VII and XXII) Girdled trees in tobacco fields are not an uncommon sight though lacking elsewhere in the Blue Grass.

The soils of this sub-region contain much less phosphorus and are more acid than those of the other two sub-regions. The surface soil, which is underlain by a rather impervious yellow clay, rarely exceeds ten inches in thickness and is generally

much thinner. Subsurface drainage is poor which increases damage from soil erosion. Rock is frequently close to the surface and the slopes are often strewn with slabs of stone. In general, this area suffers more from drought than either the Inner or Outer Blue Grass.

Plate XXIII. Girdled trees in a field of tobacco. Eden Shale Belt. Near Falmouth, Pendleton County.

No definite crop rotation system is followed in the Blue Grass. Tobacco is preferably planted on virgin soils or soils broken out of bluegrass sod. If the sod is of several years standing, two successive crops of tobacco are commonly grown and then the land is seeded to wheat or rye, followed by clover or bluegrass. A common rotation is tobacco, rye or wheat and clover. In some cases, alfalfa is followed by tobacco. The system which appears to give the best results includes the bluegrass sod.

The seed beds, in which the young plants are started under cover, are usually prepared during February and March and sown prior to April first. Plants are set in the field about the first of June, transplanting being done either by hand or machine. If planted by hand, they are usually set out during

rainy weather as this is conducive to survival of the plants. Cultivation of the fields is frequent, the first being deep to disturb the soil and admit air; the later cultivation is shallower as the objects are the eradication of weeds and the conservation of moisture.

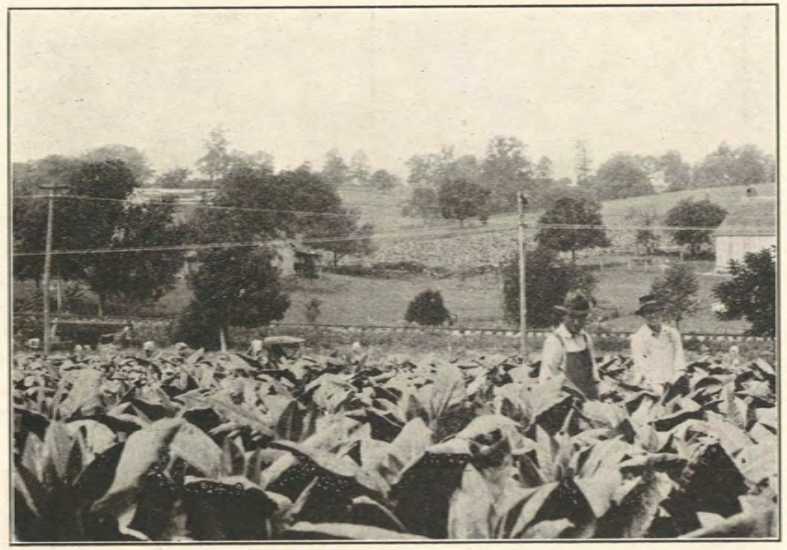

Plate XXIV. Topping tobacco. The paper sacks on the blossoms are to protect the seed during the process of formation. Inner Blue Grass. Near Millersburg, Bourbon County. On the Maysville Pike.

To obtain the requisite body in the leaves, the tops of the plants are broken out when the plants have from fourteen to eighteen leaves. This is important as it is desirable to produce leaves of uniform body which will ripen at the same time. Topping practices, therefore, differ with the soils, the growing capacity of the plant, and the judgment of the individual farmer. Plate XXIV shows a field of tobacco being topped. The sacks which cover the tops that have not been removed are designed to protect the seed during the process of formation. After topping, the suckers which appear in the axils of the leaves must be removed and the plants must be protected from attack by pests such as the cut-worm, fleabeetle and hookworm.

Plate XXV. Harvesting the tobacco crop. The tobacco is hung on sticks to wilt. Tobacco barn in background. Inner Blue Grass, Versailles Pike near Lexington, Fayette County.

Plate XXVI. Hauling the tobacco to the barn. Inner Blue Grass, Woodford County near Mundy's Landing.

About a month after topping, the veins in the leaves become brittle and yellow spots appear on the leaves which indicates that the crop is ripe and ready to harvest. In gathering the crop, the stalks are split and cut off below the lower leaves. The plants are then hung on stakes to wilt as shown in Plate XXV before being hauled to the barn, which is so constructed as to secure satisfactory ventilation in order to insure proper curing of the tobacco. The barns are so built as to provide free circulation of air or the exclusion of air currents as desired. This is accomplished by having openings fitted with hinged doors which may be opened or closed readily. In addition, ventilators are often placed on the roof. A typical tobacco barn is shown in Plate XXVII. After being hauled to the barn, the sticks of tobacco are hung on supports at sufficient distances apart to allow free circulation of air. After filling, the interior of the barn presents the appearance shown in Plate XXVIII.

During the curing process, it is necessary to control both the temperature and moisture of the air in order to prevent too rapid or too slow curing, either of which is detrimental to the proper color and flavor of the finished product. As it is difficult to do this satisfactorily, on account of variations in the weather, various attempts have been made to supplement present methods by artificial heat. There is considerable difference of opinion as to whether the flue curing methods practiced in the Carolinas would be successful in the Burley district as the Burley flavor and aroma might be destroyed by the process. (14).

After the tobacco has been cured for from six to eight weeks, it is allowed to absorb enough moisture so that it can be handled without excessive breakage. Then the leaves are removed from the stalks, classified into grades, and tied into "hands" for the market. Stripping and grading of the tobacco is done either by the farmer and his family or by "contract strippers" who strip and grade the tobacco at a fixed price per hundred weight. Weather conditions determine to a considerable extent the best time for preparing the tobacco for

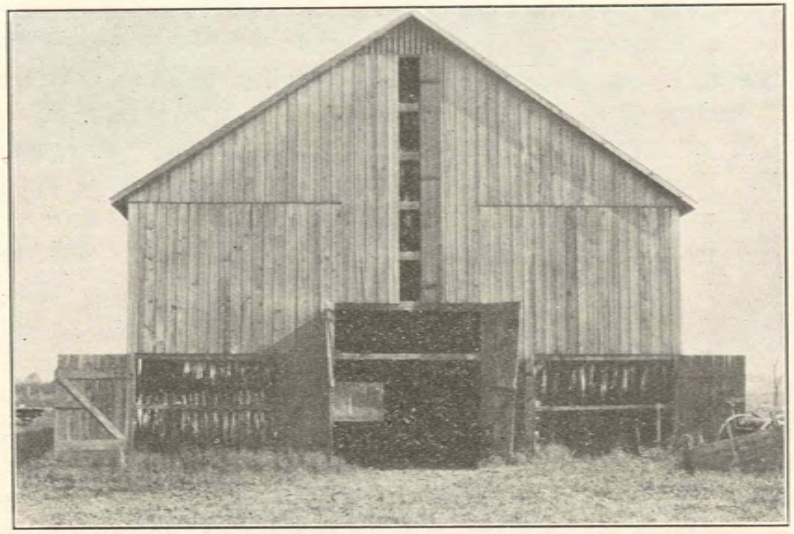

Plate XXVII. Tobacco barn filled with curing tobacco. A few of the ventilating doors are open. Inner Blue Grass on Harrodsburg Pike near South Elkhorn, Fayette County.

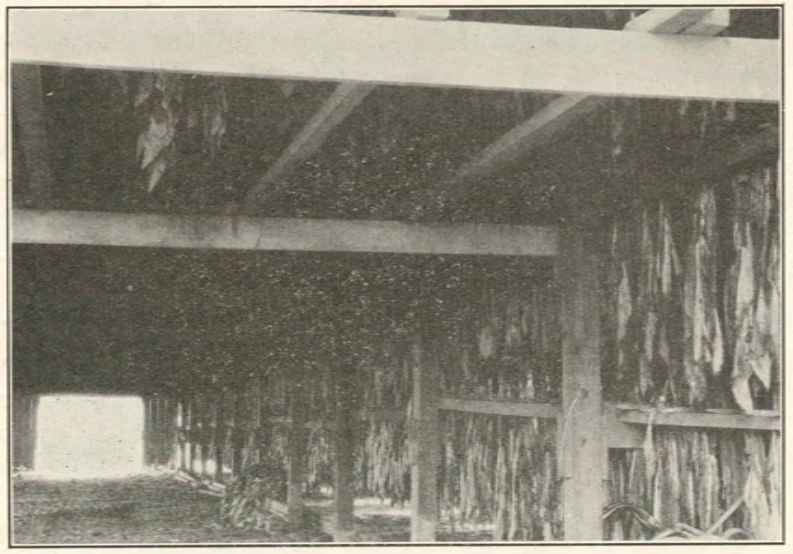

Plate XXVIII. Interior of filled tobacco barn. Interior of barn shown in Plate XXVII. Inner Blue Grass on Harrodsburg Pike near South Elkhorn, Fayette County.

market as it is preferable to have the tobacco absorb moisture from the air rather than to supply it artificially.

The greater portion of the tobacco grown in the Blue Grass is marketed by the loose leaf system, the tobacco which has been tied in hands being hauled to market, separated into different grades, and placed in baskets on the warehouse floor, only hands of the same grade and length being placed in the same basket. Then the tobacco is sold at auction to the highest bidder.

Markets for burley tobacco commonly open December first. This allows the crop ample time to cure and insures that a sufficient quantity will have been stripped out to keep the market running. Weather conditions determine the amount which moves to market at a given date as good "case weather" is necessary to prevent waste through breakage in loading, hauling, unloading and handling on the sales floor. The great loads of tobacco, covered with canvass to conserve moisture, and hauled by two, four or six horse teams, furnish one of the most picturesque scenes of the year in the Blue Grass.

The warehouses in which the sales take place are especially constructed for the purpose. They are flat roofed structures built to admit the maximum amount of light and the floors are darkened to throw the color of the tobacco into greater relief. A typical Lexington warehouse is shown in Plate L. Practically all of the county seats of the Blue Grass counties have one or more warehouses. The tobacco is sold by auction to the higgest bidder and sales are made very rapidly, from 200 to 500 baskets being sold in an hour. (A basket has a fixed maximum of 700 pounds, but no minimum weight). A mid-season sale presents a scene of great apparent confusion though the sales are in reality conducted very systematically.

After the sale on the floor of the warehouse, the tobacco is hauled to the redrying plants of the purchasers where it is run through drying chambers, cooling rooms and "ordering" or steaming chambers. It is then "in case" for aging and is packed in hogsheads.

The growing and marketing of tobacco require a great deal of labor, distributed throughout the year. The tobacco bed is prepared in February or March and seeded by the first of

April. Plants are set in the field about June 1 and thereafter must be cultivated, topped, suckered, wormed, and harvested during the summer months. Then the crop must be hauled to the barn, cured, stripped, graded, tied into hands and hauled to market. Shortly after the crop has been marketed, the preparation of the seed bed for another crop will be necessary.

In view of the large labor requirement of the crop, the acreage cultivated by a single man and his family is limited. Though most of the farms which raise burley tobacco are operated by the owners, the greater part of the tobacco is raised by share croppers who rent from 5 to 20 acres, the size of the tract being determined by the working force of the cropper's family or the amount of outside labor he expects to hire. The normal share of the tobacco crop received by the cropper who furnishes his own stock and tools is 50%. During recent years, tobacco growers have frequently rented land from the owners on a cash basis and sublet to croppers.

The large labor requirement of tobacco and its position in the cropping system of the Blue Grass have profoundly affected both cropping practice and the character of the tenant system as well as the amount of land worked by a given family.

Land rentals on a cash basis vary greatly, ranging up to a maximum of $200.00 per acre during the period of high prices for tobacco. This variation in rentals is shown in the accompanying tabulation.

CASH RENTALS IN THE BLUE GRASS

No. of Farms	No. of Acres in Tobacco	Rental Cost Per Acre, in Dollars
25	90.5	$35– $50
18	145.5	50– 100
21	183.0	100– 125
17	206.5	125– 200

Total No. of Farms	Ave. No. of Acres in Tobacco	Average Rental Per Acre
81	151.05	$99.00

Data from Bull. No. 229, Ky. Agr. Exp. Station, p. 165, 1920. Cost of producing tobacco in Kentucky.

The variations in rent reflect differences in productivity and land value which in turn are the result of differences in soil and topographic conditions. In the Eden Shale Belt, where pro-

ductivity is less than in other portions of the Blue Grass, land values and rents are at a minimum; the maximum appraised values (up to $800.00 per acre in the study from which the above data are taken), and the maximum rents are in the Inner Blue Grass where soils are best and topography is most favorable for raising tobacco as well as other crops.

Yields vary with the sub-region. In the Eden Shale Belt counties: Grant, Owen and Pendleton, yields per acre were 616, 560 and 587 pounds respectively in 1919, whereas in the Inner Blue Grass counties: Fayette, Jessamine and Woodford, yields were 1107, 878, and 940 pounds per acre respectively in the same year. In the Outer Blue Grass counties: Henry, Madison and Shelby, yields per acre were 733, 892 and 816 pounds respectively, distinctly higher than in the Eden Shale Belt counties.

Yields on individual farms vary even more widely than average yields for typical counties in each of the sub-regions. Studies of 81 farms in the Inner Blue Grass and the Eden Shale Belt, made by the Kentucky College of Agriculture in cooperation with the Office of Farm Management and Farm Economics of the United States Department of Agriculture, show a range of yields from 278 to 2224 pounds per acre, with an average yield of 1141 pounds. The findings of the study are tabulated below:

TOBACCO—VARIATION IN YIELD PER ACRE FOR INDIVIDUAL FARMS

No. of Farms	No. of Acres in Tobacco	Yields in Pounds Per Acre
21	90	less than 750 lbs.
17	110	750–1000
19	185	1000–1250
14	145	1250–1500
10	96	1500 or more

Total No. of Farms	Ave. No. of Acres in Tobacco Per Farm	Ave. Yield in Lbs. Per Acre
81	126.7	1141

Data from Bull. No. 229, Ky. Agr. Exp. Station, p. 170, 1920. Cost of producing tobacco in Kentucky.

During the period of high prices for burley tobacco, the margin between cost of production and market prices was sufficiently great to insure a profit on practically all the tobacco grown in the Blue Grass. With lower prices, not accompanied by any corresponding drop in the cost of production, only the

more effective production yields a profit, hence it becomes of great importance to the grower to raise tobacco only on land best adapted to its cultivation and to pursue methods of production and handling of the crop which insure minimum costs per pound for production and maximum prices per pound for the crop.

Agricultural commodities generally show a wider variation in the cost per unit of yield in a given area than in production costs per acre, this being true for tobacco in common with other crops. The larger the per acre yield of tobacco, the larger is the cost of production per acre and the lower the cost per unit of yield. Factors which determine the cost of producing tobacco per unit of yield are: (1) productivity of soil and yield per acre, (2) land rent, (3) labor costs, (4) machinery costs, (5) manure and fertilizer costs, (6) miscellaneous costs as canvas, spray materials, fuel, seeds.

Another factor which determines whether the crop shows a profit is the quality of the crop produced, as prices differ according to the quality and grade of the leaf as well as with supply and demand. The variation in price may be from 2½ to 3 cents a pound for the damaged grades to over 30 cents for the best leaf. Care in curing and grading and moisture control may make the difference between profit and loss in tobacco growing.

The first loose leaf warehouse was established in Lexington late in 1904. Prior to that date, the leaf was prized into hogsheads and marketed at Louisville or Cincinnati or it was sold in the barn to the buyers of tobacco manufacturers or speculators. The tobacco was either bought by grades, or if not stripped out, at a flat rate per pound. Both of these methods of disposing of the crop have been almost entirely superseded by sales on the floors of the loose leaf warehouses.

The present loose leaf warehouses are of two classes: the independent warehouses and those owned and operated by the Burley Tobacco Growers' Cooperative Association. The location of the various warehouses of both types is indicated in the accompanying tabulation. It will be noted that in many counties the Cooperative Association has acquired all the independent warehouses by purchase. Mr. J. C. Stone, president of the Cooperative Association, estimates that the independent warehouses did

not handle to exceed 25% of the total 1922 tobacco crop and from that data which he supplied, together with published reports of sales by independent warehouses, the estimate would seem to be approximately correct.

LOCATION OF TOBACCO WAREHOUSES IN THE BLUE GRASS

Counties	Burley Tobacco Growers' Co-operative Association Warehouses	Independent Warehouses
Anderson	None	None
Boone	Walton	None
Bourbon	Paris	None
Boyle	Danville	Danville
Bracken	Augusta, Brooksville and Foster	None
Campbell	None	None
Carroll	Sanders	Carrollton
Clark	Winchester	None
Fayette	Lexington	Lexington
(Fleming)	Flemingsburg	None
Franklin	Frankfort	None
Gallatin	Glencoe	None
Garrard	Lancaster	None
Grant	Dry Ridge and Williamstown	None
Harrison	Cynthiana	Cynthiana
Henry	Campbellsburg	None
Jessamine	None	None
Kenton	None	Covington
(Lincoln)	Stanford	None
Madison	Richmond	Richmond
(Marion)	Lebanon	Lebanon
Mason	Maysville	Maysville
Mercer	Harrodsburg	Harrodsburg
Montgomery	Mt. Sterling	None
Nicholas	Carlisle	None
(Oldham)	La Grange	None
Owen	Owenton	None
Pendleton	Falmouth	None
Robertson	Mt. Olivet	None
Scott	Georgetown	None
Shelby	Shelbyville	Shelbyville
Spencer	Taylorsville	None
Washington	Springfield	Springfield
Woodford	None	None

Location of warehouses of Burley Tobacco Growers' Co-operative Association supplied by J. C. Stone, President of the Association.

Location of warehouses of the Independents from a Report of Sales of Independent Tobacco Houses for 1922-23 by the R. M. Barker Tobacco Company, Carrollton, Kentucky.

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Of the tobacco produced in the Inner Blue Grass counties, probably 82% is marketed through the cooperative warehouses; of that produced in the Eden Shale Belt, 85%; but for the Outer Blue Grass, the percentage falls to 65%. These figures are only approximations, though based on definite data. Cooperative marketing of tobacco appears to have spread until it has taken over the handling of the bulk of the crop except on the outer margin of the Blue Grass area.

Vegetables and Miscellaneous Crops

Vegetables and miscellaneous crops play a very minor part in the agricultural economy of the Blue Grass, occupying only .7% of the total cropped area. The minor importance of these crops is even more marked in the Blue Grass than in other portions of the state, though in no portion of Kentucky are these crops of great significance.

The most important of the vegetable crops is the potato crop with a total of 7,445 acres and a yield of 361,800 bushels in 1919. Neither climatic nor soil conditions are well adapted to the raising of the crop which is reflected in the quality of the potatoes and the low average yield of 48 bushels per acre. Of the total crop, 55% was raised in Boone, Campbell and Kenton counties, in the Cincinnati, Covington-Newport area, where the large urban population insures a nearby market. In many counties of the Blue Grass, the acreage devoted to potatoes in 1919 was negligible. For example, in Bracken, Henry, Robertson and Woodford counties, acreages were 50, 45, 55 and 82 respectively in 1919 or 232 acres in all, which was only .14% of the total cropped area of those four counties.

Sweet potatoes (and yams) are even less important as a crop than Irish potatoes, the total acreage devoted to these crops in 1919 comprising only .02% of the total cropped area of the Blue Grass. The total acreage is so small and the distribution of the crop is so general that variations in acreage in the sub-regions are not significant, as they represent individual preferences of farmers rather than a response to location, climate, soils or other factors of the physical equipment.

VEGETABLES AND MISCELLANEOUS CROPS—1919

Counties	Irish Potatoes		Sweet Potatoes and Yams		Other Vegetables Acres
	Acres	Bushels	Acres	Bushels	
Anderson	90	3,271	6	569	15
Boone	612	27,935	19	1,633	232
Bourbon	182	6,037	7	560	40
Boyle	75	3,301	11	896	36
Bracken	50	2,299	4	232	.....
Campbell	1,945	126,337	53	4,025	1,269
Carroll	166	6,474	2	102	4
Clark	102	3,486	4	347	18
Fayette	297	20,490	15	969	512
Franklin	193	8,602	11	913	132
Gallatin	87	2,707	1	97	.....
Garrard	57	3,888	17	1,054	13
Grant	217	6,931	8	785	4
Harrison	107	4,083	1	83	4
Henry	45	1,750	6	600	5
Jessamine	96	4,057	13	774	25
Kenton	934	46,396	16	1,276	498
Madison	393	12,225	77	5,765	176
Mason	130	6,302	7	348	26
Mercer	80	4,566	9	828	10
Montgomery	218	8,536	42	3,966	36
Nicholas	77	3,097	1	110	27
Owen	89	3,175	4	308	1
Pendleton	420	11,756	15	1,239	4
Robertson	55	2,594	1	96	.....
Scott	108	3,313	2	40	36
Shelby	193	15,970	5	436	12
Spencer	59	2,856	2	111	10
Washington	293	7,041	6	474	42
Woodford	82	2,325	2	133	34
Total for the Blue Grass	7,445	361,800	367	28,799	3,221
State total	50,069	3,131,377	14,892	1,222,651	16,124

(Data from U. S. Census.)

All other vegetable crops occupied a total of 3,221 acres in the Blue Grass in 1919. or .59% of the total cropped area in that year. This acreage is divided among many vegetable crops,

none of which is of great importance. Vegetable crops, aside from the potato crop in the Cincinnati area, represent an endeavor to supply local needs, not an attempt to supplement farm income. The distribution of the various crops of this character is, therefore, not significant as has been noted for the sweet potato and yam crop. Each farmer, irrespective of whether conditions are favorable for the growth of a given crop, cultivates a small acreage to supply his own needs, but has little if any surplus to market. The distribution and acreage of these minor crops is shown in the accompanying tabulation of their volume of production in 1919.

Fruit.

The Blue Grass does not rank high as a producer of fruit even in Kentucky, a state not characterized by an extensive fruit producing industry. This results from climatic, soil and topographic conditions which have favored the growing of other crops to the exclusion of fruit production. As shown in the accompanying tabulation, apple trees comprise 60% of all fruit trees in the area, with peach trees comprising 21%. For both of the preceding varieties of fruit, yields are low under present conditions.

The hilly Eden Shale Belt area has developed fruit growing somewhat more than the Inner Blue Grass. There is also a localization of the industry in the Newport-Covington area, Campbell County alone having 16% of all fruit trees and 28% of the grape vines in the Blue Grass.

Among the small fruits, strawberries are the most important market crop in the Blue Grass area. The commercial production of the crop is almost entirely confined to Campbell and Kenton counties, Campbell County alone having more acres devoted to the crop than the total for the balance of the Blue Grass, even including Kenton County which ranks second in area of production. The concentration of the crop in this area results from nearness to markets and good shipping facilities to northern cities where the berries find ready outlet as an out of season crop. Kentucky berries compete successfully with those from Missouri, Arkansas and Tennessee and usually bring good prices. (15) Only in those areas where outlets have been

assured through marketing associations is expansion profitable, as local markets are too limited to absorb any considerable production.

BEARING FRUIT TREES—1919

Counties	No. of Apple Trees	No. of Peach Trees	No. of Pear Trees	No. of Plum Trees	No. of Cherry Trees	No. of Grape Vines
Anderson	27,362	3,582	916	1,488	2,861	583
Boone	20,208	7,568	2,690	1,807	3,087	3,957
Bourbon	10,239	1,942	1,707	1,484	1,130	1,627
Boyle	14,453	6,644	1,585	2,319	1,515	3,495
Bracken	15,856	8,376	1,342	2,608	1,421	3,090
Campbell	45,222	44,675	34,065	6,704	8,594	24,727
Carroll	6,258	1,265	307	131	598	234
Clark	20,331	4,659	808	1,001	821	2,109
Fayette	7,332	1,903	768	795	688	5,869
Franklin	20,080	4,571	1,639	4,132	2,343	2,030
Gallatin	4,382	1,162	496	372	445	331
Garrard	14,627	5,921	761	1,768	1,179	1,740
Grant	15,291	4,069	1,145	2,266	1,678	1,142
Harrison	20,986	3,956	1,755	2,618	3,074	1,955
Henry	10,076	2,509	827	920	1,676	1,890
Jessamine	12,630	2,551	613	867	642	1,416
Kenton	17,740	15,550	8,232	3,886	4,025	5,240
Madison	44,952	20,711	1,804	3,534	2,608	6,052
Mason	10,241	3,408	1,040	1,161	1,334	2,110
Mercer	18,917	6,413	2,464	3,711	3,678	2,806
Montgomery	21,180	6,667	911	1,791	945	2,802
Nicholas	13,949	2,433	700	1,238	844	600
Owen	17,216	5,013	1,201	1,746	2,139	1,125
Pendleton	35,930	7,894	295	1,949	212	229
Robertson	6,270	673	337	818	579	189
Scott	9,235	2,222	598	801	870	1,264
Shelby	28,328	6,827	2,416	1,807	3,335	3,868
Spencer	12,664	3,635	957	1,162	1,253	1,089
Washington	25,323	5,817	2,061	2,239	2,198	2,744
Woodford	7,866	2,686	1,568	750	1,179	282
Totals for Blue Grass	535,134	194,402	76,118	57,873	59,961	86,595
Totals for State	3,742,936	1,671,044	238,007	282,831	72,596	329,429

(Data from U. S. Census.)

The accompanying tabulation of the use of the cropped area in 1919 re-emphasize the predominance of hay and forage crops, of corn among the cereals, and tobacco among the cash crops. The acreage devoted to all other crops comprises only 19% of the total cropped area, and as has been stated previously, these lesser crops function mainly as they fit into a crop rotation or enable self sufficiency.

Livestock.

The livestock industry is of great importance in the Blue Grass, though of somewhat lesser significance and different character than is popularly supposed. For this area as well as for some other portions of Kentucky, many writers have so overemphasized certain characteristics as to convey an erroneous idea of actual conditions to the individual not acquainted with the region. The erroneous impression conveyed by this type of literature (16) is the result of an overemphasis of the more attractive features of the Inner Blue Grass and the tacit assumption by the reader that conditions are uniform throughout the region, a supposition far from justified by the facts.

By comparison with other portions of Kentucky, the number of horses and mules per square mile of land surface in the Blue Grass is high, being 17.3 for horses and 5.5 for mules as against state averages of 9.5 and 7.2. By contrast with other good agricultural states, however, the numbers of horses and mules per square mile of land surface is low, being 16.7 per square mile for Kentucky as compared with 27 for Iowa and 29.2 for Illinois.

Within the area, there is the maximum concentration of horses and mules in the Inner Blue Grass and the minimum in the Eden Shale Belt. This is shown in the accompanying tabulation of the distribution of horses and mules in typical counties of the sub-regions of the Blue Grass. This results in part from the more desirable character of the Inner Blue Grass agriculturally, with the consequent need for larger numbers of draft animals to do the work on the farms. It is also in part the result of the fact that stock farms devoted to the raising of horses and mules are much more common in the Inner Blue Grass than in the other two sub-regions.

USE OF THE CROPPED AREA IN 1919

Counties	Acreage in Corn	Acreage in Tobacco	Acreage in Oats	Acreage in Wheat	Acreage in Hay and Forage	Acreage in Vegetables and Small Fruits
Anderson	12,465	4,421	1,451	5,206	15,075	126
Boone	17,240	4,239	1,022	4,549	18,681	931
Bourbon	29,187	11,272	537	16,182	18,914	247
Boyle	18,557	3,460	531	12,941	10,269	188
Bracken	11,207	6,783	245	3,385	15,858	64
Campbell	7,365	978	1,687	2,819	18,808	3,883
Carroll	9,910	4,170	331	1,496	9,740	1,116
Clark	19,900	5,706	619	7,519	20,178	145
Fayette	25,386	15,677	1,056	20,074	11,600	854
Franklin	15,126	7,345	1,875	5,596	16,219	370
Gallatin	6,761	2,866	379	1,354	10,364	91
Garrard	27,340	11,996	1,416	9,691	10,335	110
Grant	12,726	6,006	638	2,903	17,225	233
Harrison	18,358	9,460	1,037	8,690	17,664	130
Henry	20,608	9,402	1,637	6,383	17,202	62
Jessamine	16,791	6,304	1,004	15,361	11,413	145
Kenton	8,033	2,122	749	1,102	14,465	1,577
Madison	48,122	7,246	1,658	10,536	23,344	717
Mason	20,274	8,605	441	10,897	23,785	173
Mercer	20,463	5,180	1,467	14,749	21,682	102
Montgomery	15,975	6,411	1,579	4,110	14,249	317
Nicholas	13,265	6,560	279	4,747	8,846	107
Owen	16,989	9,335	1,234	3,854	16,811	107
Pendleton	14,858	5,857	850	3,028	26,569	467
Robertson	5,466	2,889	86	1,323	2,820	58
Scott	21,302	10,527	1,069	12,877	14,971	156
Shelby	32,246	12,022	2,107	20,887	32,868	228
Spencer	17,733	5,481	909	6,598	14,355	102
Washington	25,296	27,150	3,229	13,278	18,859	380
Woodford	15,744	8,787	320	14,525	11,454	125
Total for Blue Grass	544,703	208,311	31,442	246,660	484,623	13,311
Total for State	3,247,167	640,241	229,464	839,987	2,084,909	783,020

Total cropped area of Blue Grass, 1,529,050 acres.
Total cropped area of State, 7,824,788 acres.

(Data from U. S. Census.)

DISTRIBUTION OF HORSES AND MULES IN THE SUB-REGIONS OF THE BLUE GRASS—1919

Counties	Total No. of Horses	No. of Horses Per Sq. Mi. of Land Surface	Total No. of Mules	No. of Mules Per Sq. Mi. of Land Surface	No. of Horses and Mules Per Sq. Mi. of Land Surface
Typical Inner Blue Grass Counties					
Fayette	5,289	21.3	2,610	9.7	31.0
Jessamine	3,389	19.7	1,667	9.6	29.3
Woodford	3,120	16.0	1,784	9.1	25.1
Typical Eden Shale Belt Counties					
Grant	4,297	16.2	636	2.4	18.6
Owen	5,680	15.4	986	2.6	18.0
Pendleton	5,486	19.6	337	1.2	20.8
Typical Outer Blue Grass Counties					
Henry	5,393	17.8	1,476	4.8	22.6
Madison	6,272	14.0	4,032	9.0	23.0
Shelby	5,877	13.7	3,191	7.4	21.1
Average for the Blue Grass		17.3		5.5	22.8

(Data from U. S. Census.)

In the vicinity of Lexington, which is located in the heart of the Inner Blue Grass, there are many celebrated stock farms. These farms, with their grove like pastures, well kept fences, fine barns, and beautiful homes set in spacious, well shaded lawns, are typical of the Inner Blue Grass only, though much stock is raised in the other sub-regions and a few estates devoted to stock raising are located in the Outer Blue Grass. Views of typical stock farms are shown in Plates II, III, V, XIII, and XXIX.

The Blue Grass, and particularly the Inner Blue Grass, is admirably adapted to the raising of fine stock. The rolling, well drained country with numerous springs, sink holes, and creeks, the almost ideal climatic conditions, and fine bluegrass pastures furnish a favorable combination which could be improved upon only with difficulty. The Inner Blue Grass is all

that it has been pictured in the attractiveness of the natural setting; it is an area to which one wishing to live the life of a country gentleman would be attracted. The physical setting of the area, inherited traditions, and the character of the racial stock make the breeding of fine horses and other stock one of the logical activities of the area.

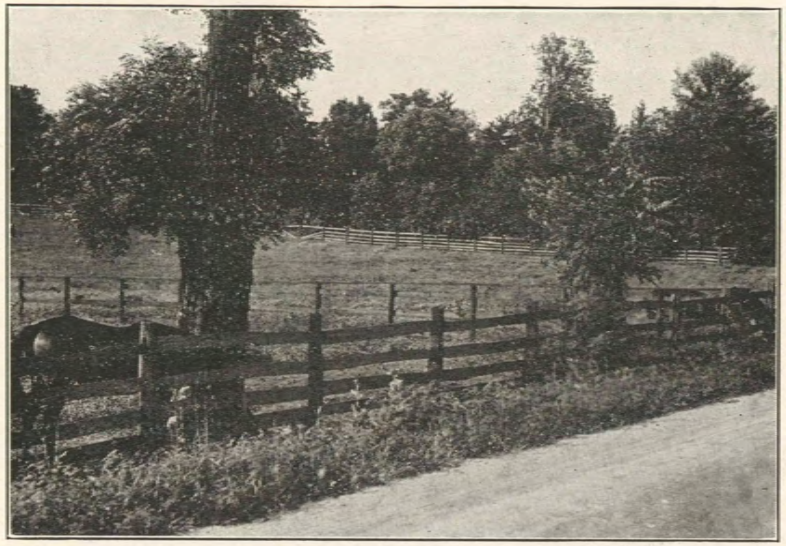

Plate XXIX. Stock farm in Fayette County. Shows horses in separate small fields characteristic of the stock farms of the Inner Blue Grass devoted to the breeding of fine horses. Harrodsburg Pike near Lexington.

The Blue Grass possesses many natural advantages for the raising and marketing of beef cattle. Climatic conditions enable the production of a corn crop which gives good yields of corn, and at the same time, large quantities of fodder or silage; the long growing season and excellent bluegrass pastures furnish good grazing for a large fraction of the year; location near the southern states furnishes the opportunity to purchase cotton seed meal to advantage and the nearby markets of Louisville, Cincinnati, and the somewhat more distant Chicago market, afford an outlet for the finished stock. In consequence of these facts, the feeding and finishing of beef cattle is an important industry in the Blue Grass. This is of great importance to the

area as it is not only normally a profitable business, but it also tends to conserve and improve soil fertility.

DISTRIBUTION OF BEEF CATTLE IN THE SUB-REGIONS OF THE BLUE GRASS—1919

Counties	No. of Beef Cattle	No. of Beef Cattle Per Sq. Mi. of Land Surface
Typical Inner Blue Grass Counties		
Fayette	5,494	20.4
Jessamine	2,308	13.4
Woodford	3,878	19.8
Typical Eden Shale Belt Counties		
Grant	1,877	7.1
Owen	3,216	8.7
Pendleton	1,902	6.8
Typical Outer Blue Grass Counties		
Henry	3,889	12.8
Madison	15,481	34.7
Shelby	6,056	14.7
Average for the State		10.7

(Data from U. S. Census.)

The Eden Shale Belt has relatively few beef cattle, the number per square mile of land surface being only about half the average for the Blue Grass and also less than the state average. This is the result of the relatively undesirable agricultural character of the area and the consequent absence of a surplus of corn to be used for preparing cattle for the market.

In the Inner and Outer Blue Grass, the number is distinctly above the average for the state. More striking, however, than the variation in number in the sub-regions is the concentration of beef cattle in the counties of the eastern and southern margins of the Blue Grass, (See tabulation on pg. 110) Montgomery, Bourbon, Madison and Clark counties having 38.0, 36.1, 34.7 and 31.1 beef cattle per square mile of land surface respectively, which is approximately twice the average for the Blue Grass and over three times that for the state. This is probably

related to the fact that these counties serve as the feeding areas for cattle bred in the surrounding belt of hilly territory.

Plate XXX. Beef cattle in bluegrass pasture. Inner Blue Grass, near Paris, Bourbon County.

Dairy cattle are more numerous than beef cattle in the Blue Grass, as in other portions of Kentucky. In this area, the number per square mile of land surface is well above the state average, as in the case of beef cattle. This is particularly true in the better portions of the area and in the vicinity of the larger urban aggregations.

The distribution of dairy cattle in the sub-regions of the of the Blue Grass reflects not only the relative agricultural desirability of the various sub-regions but location as well. In all

CATTLE IN THE BLUE GRASS—1919

Counties	Beef Cattle		Dairy Cattle	
	Total No.	No. Per Sq Mi. of Land Surface	Total No.	No. Per Sq. Mi. of Land Surface
Anderson	2,724	13.5	3,603	17.9
Boone	2,836	11.3	9,290	37.0
Bourbon	10,992	36.1	5,189	17.0
Boyle	4,300	23.1	3,328	17.9
Bracken	1,678	8.2	5,469	26.8
Campbell	441	3.0	7,662	52.8
Carroll	1,461	11.0	3,131	23.7
Clark	8,251	31.1	5,931	22.3
Fayette	5,494	20.4	7,092	26.3
Franklin	3,019	15.1	5,263	26.4
Gallatin	1,250	11.5	1,926	17.6
Garrard	4,977	21.0	4,287	18.0
Grant	1,877	7.1	5,505	20.8
Harrison	3,990	12.8	7,047	25.8
Henry	3,889	12.8	5,877	19.3
Jessamine	2,308	13.4	4,314	25.0
Kenton	439	2.6	6,697	41.0
Madison	15,681	34.7	8,039	18.0
Mason	4,437	19.5	5,885	26.0
Mercer	3,867	15.2	5,969	23.5
Montgomery	7,530	38.0	3,196	16.1
Nicholas	3,345	16.0	4,476	21.5
Owen	3,216	8.7	5,667	15.4
Pendleton	1,902	6.8	11,048	39.5
Robertson	1,431	13.1	2,233	20.4
Scott	5,139	17.7	5,027	17.3
Shelby	6,056	14.1	12,003	28.1
Spencer	2,018	10.8	5,768	31.0
Washington	5,090	27.3	6,040	32.4
Woodford	3,878	19.8	3,148	16.1
Total for the Blue Grass	123,316	17.1	170,110	23.6
Total for the State	433,659	10.7	659,794	16.4

(Data from U. S. Census.)

Plate XXXI. Dairy cattle. Inner Blue Grass, Richmond Pike near Lexington, Fayette County.

DISTRIBUTION OF DAIRY CATTLE IN THE SUB-REGIONS OF THE BLUE GRASS—1919

Counties	No. of Dairy Cattle	No. of Dairy Cattle Per Sq. Mi. of Land Surface
Typical Inner Blue Grass Counties		
Fayette	7,092	26.3
Jessamine	4,314	25.0
Woodford	3,148	16.1
Typical Eden Shale Belt Counties		
Grant	5,505	20.8
Owen	5,667	15.4
Pendleton	11,048	39.5
Typical Outer Blue Grass Counties		
Henry	5,877	19.3
Madison	8,039	18.0
Shelby	12,003	28.1
Average for the Blue Grass		23.6

(Data from U. S. Census.)

counties of the Blue Grass, irrespective of the sub-region in which they fall, the dairy industry is well developed near the larger urban centers. For example, Campbell, Kenton, Pendleton and Boone counties, with 52.8, 41.0 and 37.0 dairy cattle

Plate XXXII. Sheep grazing in a bluegrass pasture. Inner Blue Grass, near Keene, Jessamine County.

to the square mile of land surface, lead all Blue Grass counties in the development of the dairy industry. Similarly, on the western margin, the dairy industry is well developed in Shelby and Spencer counties and the same is true in the Lexington area.

Sheep rank next to cattle in number in the Blue Grass, the area having 55.7% of all sheep in the state. They represent a paying investment; they are valuable in conserving soil fertility; wool and mutton are marketed readily; sheep require little expensive feed and they supply income from wool and spring lambs in the spring and early summer before crops are ready for market. Sheep are also valuable in the Blue Grass as they clean up fields of weeds so that cleaner hay and seed are produced. (17) Although Kentucky, and certainly not the Blue

Grass, will never become a great sheep producing area to the exclusion of all else, the sheep raising industry seems destined to become more important than it has been in the past, especially in the hilly areas.

DISTRIBUTION OF SHEEP IN THE SUB-REGIONS OF THE BLUE GRASS—1919

Counties	Total No. of Sheep	No. of Sheep Per Sq. Mi. of Land Surface
Typical Inner Blue Grass Counties		
Fayette	12,127	45.0
Jessamine	5,859	34.0
Woodford	12,780	65.5
Typical Eden Shale Belt Counties		
Grant	24,806	90.1
Owen	35,294	96.1
Pendleton	14,040	50.3
Typical Outer Blue Grass Counties		
Henry	6,409	21.1
Madison	6,004	13.4
Shelby	14,701	34.4
Average for the Blue Grass		54.8
Average for the State		17.6

(Date from U. S. Census.)

Sheep are present in both the best and the poorest sections of the area. In the hilly Eden Shale Belt, their presence denotes effective use of low grade land, unsuited for cropping because of steep or eroded slopes. In the Inner Blue Grass counties, sheep are temporarily more profitable than beef cattle in the opinion of many of the farmers, hence it is a common sight in the Inner Blue Grass to see great flocks of sheep feeding in bluegrass pastures on the highest priced land in the State of Kentucky as shown in Plate XXXII and to meet great numbers being driven to market. Whether this condition will continue is doubtful. Probably a certain number of sheep will continue to be kept, but not the number which exists in the area at the present time.

In the Eden Shale Belt, sheep justify themselves in a permanent position in the farm economy.

The number of swine per square mile of land surface in the Blue Grass slightly exceeds the state average, being 49.4 as compared with an average for the state of 37.4 in 1919. By comparison with Iowa, however, with its total of over 7,500,000 hogs (5 times that of Kentucky,) and 135 to the square mile, the number is not large. Further, swine in the Blue Grass do not constitute as large a fraction of the total number of live stock as for the state as a whole, being 29.4% as compared with 37.7% for the state.

DISTRIBUTION OF SWINE IN THE SUB-REGIONS OF THE BLUE GRASS—1919

Counties	Total No. of Swine	No. of Swine Per Sq. Mi. of Land Surface
Typical Inner Blue Grass Counties		
Fayette	19,271	71.6
Jessamine	11,860	68.9
Woodford	11,874	60.4
Typical Eden Shale Belt Counties		
Grant	7,512	28.4
Owen	9,690	26.4
Pendleton	8,832	31.6
Typical Outer Blue Grass Counties		
Henry	13,059	43.0
Madison	25,515	57.2
Shelby	24,432	57.2
Average for the Blue Grass		49.4

(Data from U. S. Census.)

Within the area, the distribution is uneven as shown in the accompanying tabulation of data for typical counties of each of the sub-regions. This difference in distribution in the sub-regions only re-emphasizes the differences in agricultural desirability which has been indicated throughout the discussion of the use of the land.

The raising of poultry is a rather important source of supplementary income on many farms, the industry being somewhat more important in the Blue Grass than for the state as a whole. Chickens comprise nearly 95% of all poultry. Within the area, the Eden Shale Belt counties show a somewhat smaller number of poultry to the square mile than do the counties of the Inner and Outer Blue Grass. This is not so much the result of a decrease in the relative importance of this industry in the area as it is of the lesser productivity of the farms which is accompanied by decreased production of all crops and animal products.

The accompanying tabulation also shows that the number of hives of bees reaches a maximum in the hilly Eden Shale Belt counties which results from the relatively poor character

DISTRIBUTION OF POULTRY AND BEES IN THE SUB-REGIONS OF THE BLUE GRASS—1919

Counties	Total No. of Chickens	Chickens Per Sq. Mi. of Land Surface	Total No. of Other Poultry	No. of Other Poultry Per Sq. Mi. of Land Surface	Bees, No. of Hives	No. of Hives of Bees Per Sq. Mi. of Land Surface
Typical Inner Blue Grass Cos.						
Fayette	102,061	378	6,472	24	322	1.2
Jessamine	76,504	444	3,589	20	282	1.6
Woodford	54,416	279	4,048	20	292	1.4
Typical Eden Shale Belt Cos.						
Grant	80,530	338	8,748	33	1,649	6.2
Owen	93,079	253	4,965	13	1,984	5.4
Pendleton	103,560	371	4,388	15	3,132	11.2
Typical Outer Blue Grass Cos.						
Henry	97,439	321	4,004	13	1,339	4.4
Madison	200,266	449	8,978	20	1,703	3.8
Shelby	129,970	304	6,093	14	1,091	2.5
Average for the Blue Grass		377		22		4.5
Average for the State		260		13		3.9

(Data from U. S. Census.)

of the area. In the Eden Shale Belt, the production of honey represents an attempt at self sufficiency, not commercial production except in very small part.

Any detailed study of the use of the land in the Blue Grass makes evident the fact that different portions vary greatly in productivity and desirability. The statistical tabulations of crop production and the animal industries which accompany this study illustrate the fact that such variations occur. They do not, however, indicate with absolute exactness the amount of difference which exists in the three sub-regions of the Blue Grass which have been recognized, tending to minimize the differences rather than exaggerate them.

The reason for this is that no one of the political divisions or counties lies entirely in any one of the sub-regions. The counties used to illustrate conditions in the Inner and Outer Blue Grass, therefore, include small areas of lesser desirability and the counties selected to illustrate conditions in the Eden Shale Belt include small tracts of more desirable character. The result of this inclusion is that a study of the statistics of production of these type counties makes the Eden Shale Belt appear slightly more desirable than it actually is and decreases somewhat the apparent desirability of the other two sub-regions. It is necessary to bear this in mind in iterpreting the statistical information, though the error introduced is not sufficiently great to make necessary any fundamental modification of conclusions as to the relative desirability of the various sub-regions of the Blue Grass. It is, however, desirable to bear in mind that any statements of differences and understatements rather than exaggerations of the relative desirability of the three sub-regions: the Inner and the Outer Blue Grass and the Eden Shale Belt.

Analysis of the causes for success and failure in a large number of Blue Grass farms, in Mason, Scott and Madison counties, by the U. S. Department of Agriculture working in cooperation with College of Agriculture of the University of Kentucky, (18) together with first hand observations by the author in the same and other portions of the Blue Grass, would tend to indicate that aside from adjustments which are necessary, based on size of farm, topography, soil fertility and accessibility to market, the general type of farm practice best suited to Blue Grass conditions is a combination of livestock and tobacco. This combines in a given farm both intensive and extensive types of agriculture. Blue Grass is adapted to the soils, furnishes excellent pasturage for cattle, prevents soil erosion and preserves soil fertility, especially in association with a live stock industry. These Bluegrass sod lands raise maximum crops of high quality tobacco; the intensive crop, tobacco, enables the farmer to secure large returns per acre.

In special areas, well located with reference to urban centers, dairying with the product sold as market milk is more profitable than a combination of grazing and tobacco production.

In the farming practice, diversification is an important factor in success, as it enables a better distribution of labor throughout the year, tends to preserve soil fertility by enabling better crop rotations, and makes the farm income more stable and regular. Diversification should be of such character that it saves time, labor and money. A variety of enterprises merely for the sake of diversity is without value. No fundamental changes in the character of the agriculture of this area may be expected, only modifications of existing practices, as the permanence of agriculture under present practices is not threatened seriously.

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CHAPTER IV.

LIVING CONDITIONS IN THE BLUE GRASS

Conditions in the Rural Districts

Living conditions present great contrasts in the three sub-regions of the Blue Grass. In the Inner Blue Grass, land holdings are not infrequently large and the houses of the owners of the land are fine residences, generally set well back from the highway in large, well shaded yards. Typical homes of this character are shown in Plates III and XXXIII. Tenant houses in this sub-region are unpretentious in character but are generally comfortable, though modest structures. Housing conditions are good, but contrasts in housing conditions are very marked.

Plate XXXIII. Typical Inner Blue Grass home. Southern Scott County.

The numerous barns and outbuildings typical of northern farms are not characteristic in this area, as climatic conditions render them unnecessary. Hay is stacked in the field and stock

Numbers in parenthesis refer to the bibliography at the end of the chapter.

runs out of doors much of the year. Farms in which the major emphasis is placed upon the breeding of fine stock have more extensive barns than do those in which stock raising and finishing is only one of the farm activities. (See Plate V). In all

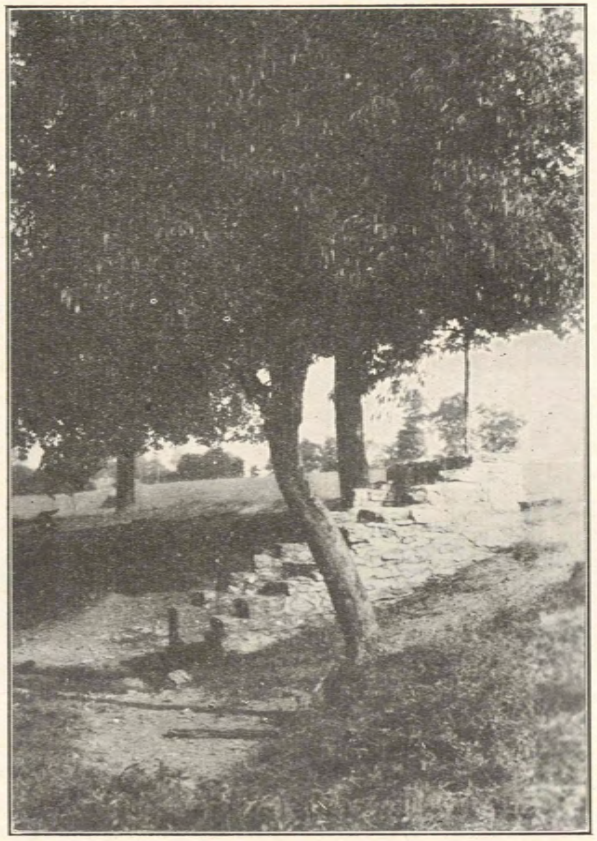

Plate XXXIV. Walled in spring. Inner Blue Grass. Versailles Pike near Lexington, Fayette County.

portions of the Blue Grass, the tobacco barn is a characteristic outbuilding.

Fields in the Inner Blue Grass are usually well fenced. Frequently the fences are constructed of limestone slabs and add greatly to the attractiveness of the rural setting. (See Plate XXXV.) In other cases they are of the type of rail construction shown in Plate XXIX, the rails being mortised into the

posts. Such fences required much labor in their construction and were erected largely if not entirely by slave labor.

The numerous creeks and ponds furnish an abundance of water for stock on most of the farms of this sub-region. (See Plates I and V.). In addition, many springs occur along the slopes bordering depressions or stream courses. Frequently these are walled in with limestone slabs as shown in Plate XXXIV, which adds to the picturesqueness of the area and affords protection to the supply of water.

In the Outer Blue Grass, living conditions are much the same as those of the sub-region described previously, as a result of the great similarity of physical conditions in the two areas. Large land holdings are less common, however, than in the Inner Blue Grass, hence the fine houses so typical of the Inner Blue Grass are of less frequent occurrence. (See Plates XIII and XIV.) The more pretentious houses are set well back from the highway and the approaches are similar in character to those of the better homes of the Inner Blue Grass. Most of the farm houses, however, are much less elaborate, though roomy, substantial, and comfortable structures as shown in Plate XXXV. Yards are large and well shaded but do not embrace several acres, as often occurs in the grounds surrounding the more pretentious homes. Tenant houses, here as elsewhere in the Blue Grass, are very different in character from the homes of the owners of the land. In this sub-region, many are poor, though the average is fair.

Barns and outbuildings are somewhat less numerous than in the Inner Blue Grass because of the lesser importance of the breeding of fine stock and the greater emphasis placed upon the production of crops and the feeding and finishing of cattle. The tobacco barn is, however, fully as prominent a feature of the landscape.

Fences, as in the Inner Blue Grass, are frequently constructed of limestone slabs, as shown in Plate XXXV, but the rail fence characteristic of the Inner Blue Grass is lacking though rail fences of a different type are not uncommon. Woven wire fencing is replacing other types in this sub-region as it has in other portions of the country.

Stock obtains water from sink holes, springs, and creeks as in other sections of the Blue Grass. One of the walled in springs typical of this area is shown in Plate VI.

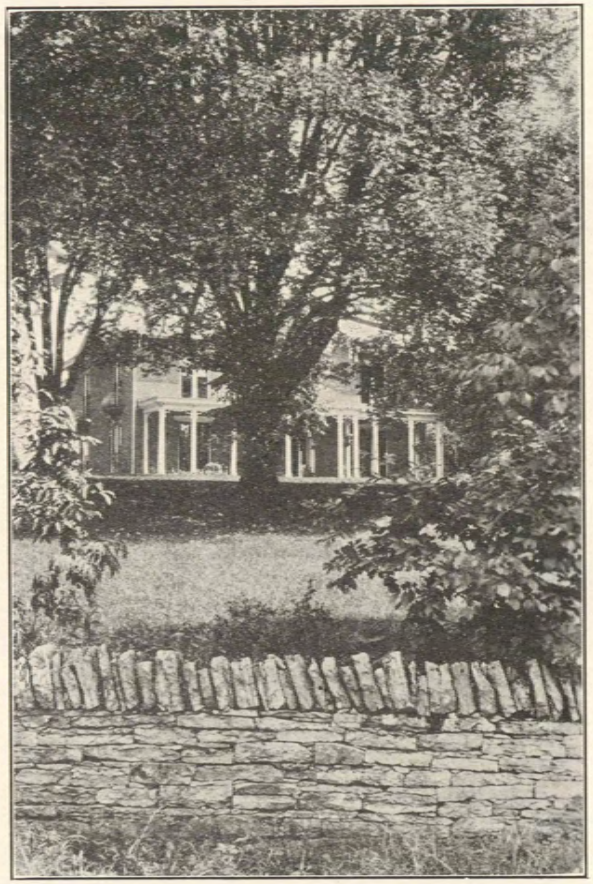

Plate XXXV. Typical Outer Blue Grass home. Eastern Clark County.

In this sub-region, living conditions in general reflect the fact that this is an area of somewhat lesser promise and performance than is the Inner Blue Grass.

The Eden Shale Belt is distinctly inferior in the opportunities which it presents and this fact is reflected not only in the decreased crop production, as has been seen, but in poor living conditions as well. In the Eden Shale Belt, there

are none of the large estates and fine homes so characteristic of the balance of the Blue Grass.

The better homes are no more than average farm dwellings and the poorer houses are often miserable shacks or even

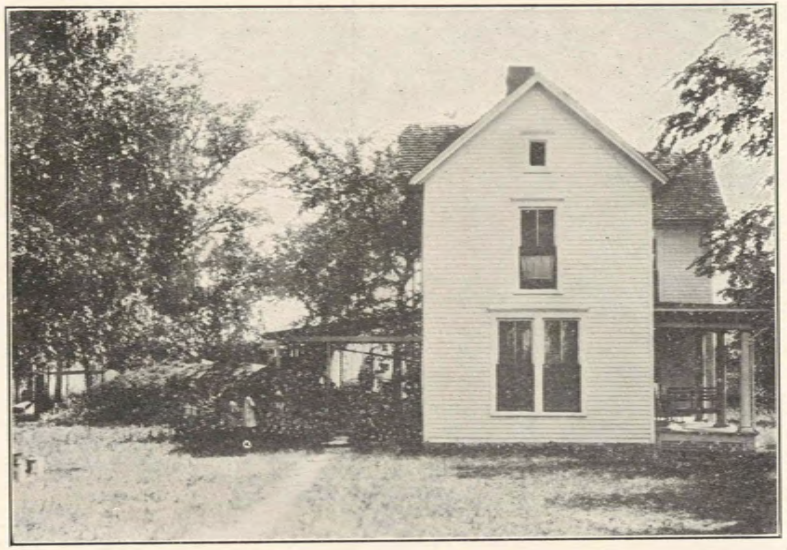

Plate XXXVI. One of the better houses in the Eden Shale Belt. The outside cellar shows at the left of the house. Near Pea Ridge, Scott County.

log cabin survivals of the pioneer period. Better houses of this sub-region are shown in Plates VII and XXXVI; one of the poorer houses are shown in Plate X. Yards are small, and in many cases, are not well kept. Topographic conditions in some portions of the sub-region make the small yard almost a necessity.

Outbuildings are few in number, even by Kentucky standards, and in most cases they are poor. Aside from tobacco barns, few outbuildings are made necessary either by climatic conditions or the agricultural economy of the area, therefore they are lacking. Fences are not well kept up and are of various types as shown in Plates XVII and XXXVII. On the roads, sleds such as shown in Plate XXXVII are often used in preference to wagons.

Sink holes are lacking, springs are few in number, and creeks run dry in the summer, except for a few pools. (See Plates VII, X and XI.) Only the larger streams possess any appreciable flow during the late summer. Resort is, therefore, frequently had to watering ponds, as the puddled yellow clay holds the water in such ponds satisfactorily. Such a pond is shown in Plate XXXVIII.

Plate XXXVII. Type of sled in common use in the Eden Shale Belt. Near Flingsville, northern Grant County.

Even a superficial observer cannot help being impressed by the change in living conditions on crossing the boundaries of the Eden Shale Belt. The change is so apparent that the limits of the geological formations which are responsible for the lesser opportunity afforded by this sub-region of the Blue Grass can be drawn with a high degree of accuracy from a determination of the line where living conditions of the Eden Shale Belt change to those of the Inner and Outer Blue Grass regions.

In addition to the three sub-regions which have been recognized, islands of Silurian strata persist as remnants in the Outer Blue Grass Area. In these hilly sections of poor soil and

unfavorable topographic conditions, living conditions are very poor. Fields are limited in extent, irregular in shape, and yields are unsatisfactory. These conditions are reflected in the character of the houses, outbuildings, and the standards of living. A typical view in one of these "Knobs" areas is shown in Plate XV.

Plate XXXVIII. Watering pond for stock in the Eden Shale Belt. South of Falmouth, Pendleton County.

Condition in the Urban Communities.

Throughout the Blue Grass, county court day still remains, preserving at least a portion of the importance which it possessed at an earlier date. In the hillier areas, where roads are often poor and isolation is greatest, most importance attaches to the observance of the day, but even in Fayette County there is a strong sentiment in favor of retention of practices associated with the observance of court day, so that on "Cheapside," sights such as shown in Plate LI may still be seen in Lexington.

In the outlying counties, where court day still retains much of its former importance, the open square around the court house at the county seat is the place of political discussion, the center

of the social life of the community, and the market place for business transactions. On court day, the small group sitting about the stores, the few purchasers and promenaders give place to the throngs in which the Kentuckian delights. Though the institution has changed greatly in character since it was first inaugurated, it still persists as one of the most interesting and picturesque features in the life of Blue Grass Kentucky.

Another notable institution in the Blue Grass is the fair. Originating as a place for buying and selling, it passed through various stages of development, including that of the pre-war period when it was one of the focal points around which the life of the community centered, into the fair of today in which the exhibition of fine stock and horse racing occupy the foreground. James Lane Allen (1)* has described vividly and accurately the evolution and present status of both court day and the fair in his descriptions of the Blue Grass of Kentucky.

None of the smaller county seats of the Blue Grass have been changed appreciably in character by modern industrial development. They still retain, very slightly modified, the charm of southern communities. Few of the streets of the smaller towns are paved; in some cases, "stepping stones," or narrow slabs of limestone set on edge, suffice to allow the pedestrian to cross the muddy streets. (See Plate LVI.) In many of them, court day is still the only time in the month when activity prevails on the streets. A fuller characterization of individual towns will be deferred until the consideration of urban development in Chapter VII.

In the smaller communities, life is still essentially that of the southern village of pre-war days, modified to only a slight degree by modern invention and improvements, such as lighting and sewer systems, and a modern source of water supply and even this is sometimes lacking, as adequate supplies of water of satisfactory quality for domestic use are difficult to obtain. The present sources of municipal water supply in order of importance are streams which are muddy and frequently contaminated, ponds, and springs. Chemical treatment is generally necessary in order that the water may be used with safety. (2)

*Numbers in parenthesis refer to the bibliography at the end of the chapter.

In the urban communities, there are present the great contrasts of living conditions so typical of the Blue Grass. The better residence sections contain many fine homes, but the poorer portions of the towns are characterized by unpainted and frequently unplastered houses of two or three rooms. The close spacing of many of these houses, as in Frankfort, where level land is limited in amount, tends to create unsatisfactory sanitary conditions which are lacking in the rural communities where crowding is not present. It is only fair to state, however, that many of these conditions are entirely unnecessary, resulting from the failure on the part of the people to observe even the simplest of sanitary measures.

Schools

In addition to elementary schools, the Blue Grass possesses upwards of fifty accredited high schools (3) which are so distributed that it is comparatively easy for all children in the area to attend. Further, good roads and numerous trolley and bus lines make conditions much better in this respect than in most

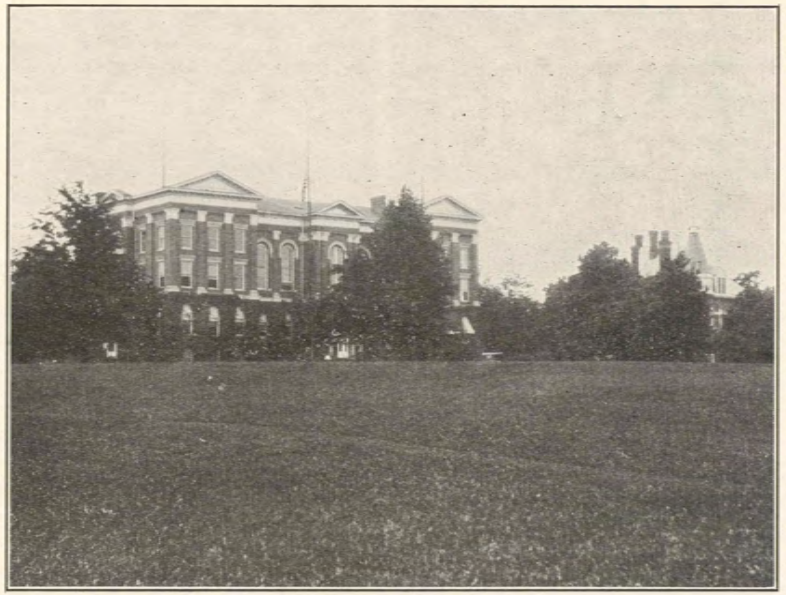

Plate XXXIX. View of the administration building of the University of Kentucky. View from S. Limestone Street, Lexington.

EDUCATIONAL INSTITUTIONS IN THE BLUE GRASS OFFERING WORK OF COLLEGE GRADE

State Educational Institutions	Colleges of the State College Association	Other Institutions Offering Two or More Years of College Work
University of Kentucky, Lexington, Fayette Co.	Georgetown College, Georgetown, Scott Co.	Millersburg College, Millersburg, Bourbon Co.
Eastern Kentucky State Normal School, Richmond, Madison Co.	Central University, Danville, Boyle Co.	Kentucky College for Women, Danville, Boyle Co.
Kentucky Normal and Industrial Institute (colored), Frankfort, Kentucky.	Transylvania College, Lexington, Fayette Co.	Hamilton College, Lexington, Fayette Co.
Kentucky School for the Deaf, Danville, Boyle Co.	Kentucky Wesleyan College, Winchester, Clark Co.	Sayre College, Lexington, Fayette Co.
		Asbury College, Wilmore, Jessamine Co.
		Margaret College, Versailles, Woodford Co.

Compiled from the State Educational Directory, Bulletin of the Kentucky Department of Education.

portions of the state. Beyond the high school, numerous opportunities are presented for securing a higher education, as is indicated in the accompanying tabulation of the higher institutions of learning in the area.

The greater average desirability of the Blue Grass Region, by contrast with other portions of Kentucky, is evidenced by the number of schools, their fairly uniform distribution, and the number of institutions of higher learning. A criticism of the system which is warranted is that there has been too much duplication of effort. Some consolidation would obviously be advantageous as it would decrease expenses and increase efficiency.

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CHAPTER V.

HIGHWAYS AND TRANSPORTATION

Roads

As in other portions of Kentucky, accurate information as to the total mileage of public roads and the mileage of surfaced roads in good condition is difficult to secure. Plates XXVI, XLI, XLII and XLIII show the wide variation in character of the roads which pass as turnpikes. The accompanying tabulation of the mileage of the roads in the Blue Grass is based on data from the Twenty-fourth Biennial Report of the Bureau of Agriculture, Labor and Statistics for the State of Kentucky. (1)* It is presumably only an approximation, as the returns for the mileage of turnpiked roads in certain of the counties is obviously too high if a turnpiked road is assumed to be one in fair to good condition.

Main roads focus upon county seats, this being particularly noticeable in Fayette County, where roads radiate, like the spokes of a wheel, from Lexington to all parts of the Blue Grass. In detail, these roads do not pursue straight paths, but topographic obstacles are so minor that in general the roads are air line routes between towns. In all cases, the focus for the roads of an area is a county seat, though a given county seat may not be the focus for the roads of the county, as these may have been established prior to the formation of the county. As Lexington, the major population center of the area, was founded at an early date, it is the principal focus of the Blue Grass roads.

The projected system of State and Federal Highways for Kentucky is practically completed in the Blue Grass. All of these roads are passable, except where construction work in progress may involve detours, and most of the completed highways are wide, hard surfaced roads, in excellent condition.

Unsurfaced roads in the Blue Grass become almost impassable after rains, hence surfacing of the roads in some manner is

*Numbers in parenthesis refer to the chapter bibliography at the end of the chapter.

common. In most cases, the surfacing material is broken rock. In the areas with better roads, the rock is crushed and the surface is finished with fine material and may be treated with a binder, furnishing excellent roads of which the one shown in Plate XLII is typical. In other cases, slabs of rock which wash out on the hillsides may be dumped in the road and broken by hand so that the finished road is similar to that in the foreground

ROAD MILEAGE IN THE BLUE GRASS

Counties	No. of Miles of Public Road	No. of Miles of Turnpike
Anderson	.....	276
Boone	.....	200
Bourbon	.....	300
Boyle	.....	120
Bracken	150	260
Campbell	.....	200
Carroll	.....	200
Clark	110	240
Fayette	.....	385
Franklin	.....	300
Gallatin	150	150
Garrard	.....	130
Grant	100	600
Harrison	.....	350
Henry	200	300
Jessamine	50	300
Kenton	.....	487
Madison	368	274
Mason	411	326
Mercer	.....	325
Montgomery	400	125
Nicholas	.....	250
Owen	240	115
Pendleton	615	315
Robertson	.....	100
Sott	450	400
Shelby	623	433
Spencer	290	50
Washington	510	270
Woodford	270	220
Total for the Blue Grass	4,937	8,001

Data from the Twenty-Fourth Biennial Report of the Bureau of Agriculture, Labor and Statistics for the State of Kentucky.

in Plate XLIII. Such roads are so difficult to travel after "improvement" that traffic in large part abandons the road and establishes a new track until time and the passage of wagons have smoothed off the sharp angles of the freshly broken rock and packed the fragments.

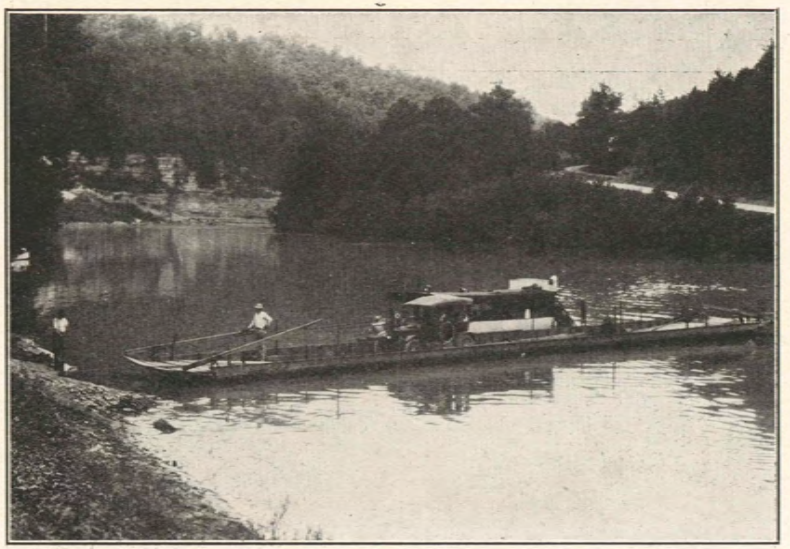

Plate XL. Ferry across the Kentucky River. At Boonesboro, southern Clark County.

Many of the main traveled highways are surfaced with rock asphalt, which when crushed, spread and rolled, forms a very satisfactory road surface. This type of construction is common throughout the Inner Blue Grass on the principal highways, the limestone pikes generally being the less traveled or secondary roads. Recently, there has been some use of cement in road construction, though as yet these roads comprise but a small percentage of the total mileage in the Blue Grass.

The smaller streams are commonly bridged in the better portions of the Blue Grass, but where roads cross the Kentucky River, the construction of bridges is both difficult and expensive because of excessive stream fluctuation and the gorge like character of the valley, hence few bridges have been built and ferries are quite commonly employed as a means of crossing the river. These ferries vary greatly in capacity, depending upon

the traffic which the road carries. Many of them yield considerable revenues to their operators. The ferry at Boonesboro, which is one of the best equipped of the Kentucky River ferries, is shown in Plate XL.

The larger rivers, as the Kentucky, flow through gorges, many feet below the general level of the upland, hence the approaches to many of these ferries are very difficult, the roads being narrow, steep, with many sharp turns, and sometimes rough as well. The approach to the ferry at Boonesboro shown in Plate XL is very much better than the average as to width, grade, and the character of the turns. The road is also excellent.

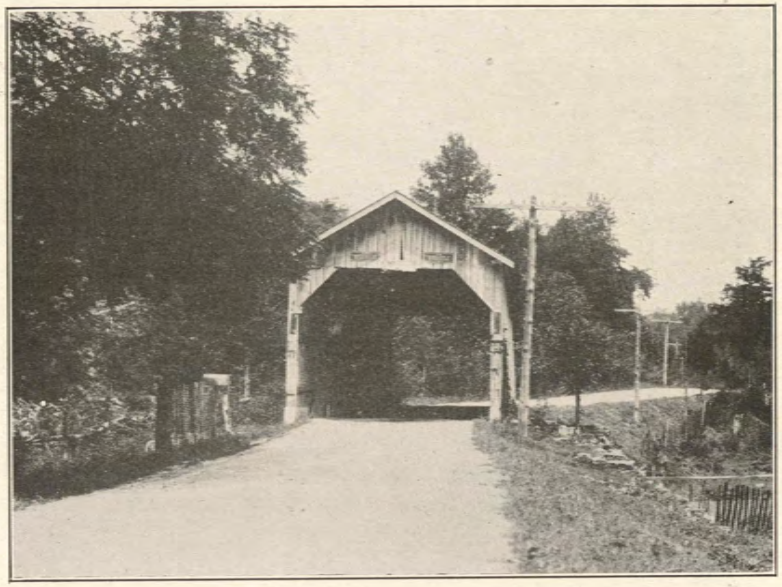

Plate XLI. Covered bridge across Stony Creek. Outer Blue Grass. Maysville Pike in northern Nicholas County near Oakland Mills.

Most of the bridges which cross the smaller streams are of steel construction, but some of the old, covered bridges still remain, particularly in the outlying counties. Such a covered bridge is shown in Plate XLI.

Of the roads in the sub-regions, those of the Inner Blue Grass are best, this being particularly true in Fayette County, where essentially all roads are of good width, hard surfaced, and

kept in excellent condition. This is true not only for the main traveled highways, but for the cross roads as well. Plates XXVI, XXIX and XLII show roads which are typical for this subregion. Few portions of the country possess roads of more uniform excellence than does this section of the Blue Grass.

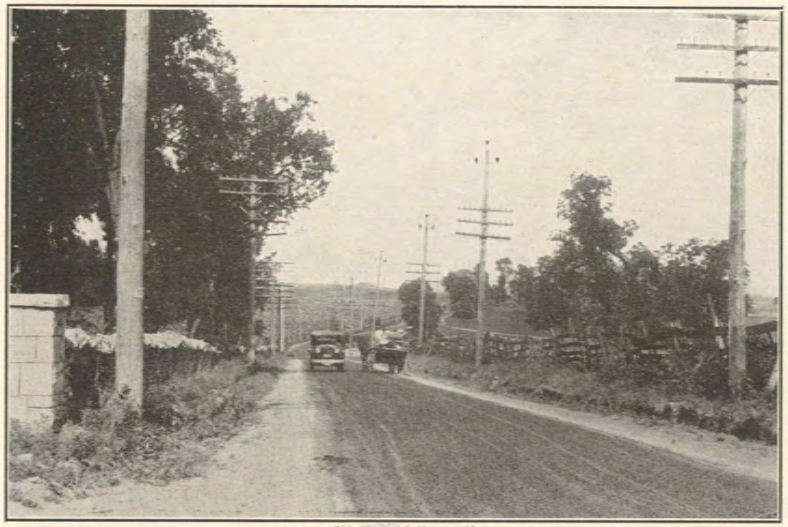

Plate XLII. Surfaced highway in the Inner Blue Grass. On the Georgetown Pike, Franklin County. The road has been newly surfaced and oiled.

The main traveled highways are commonly surfaced with rock asphalt (See Plate XXIX), though sometimes crushed limestone and a binder are employed (See Plate XLII); the cross roads are surfaced with finely crushed limestone. The topography is gently rolling so that roads run in straight lines and heavy grades are lacking. All streams, except the Kentucky, are crossed by bridges and ferries run regularly at all places where main roads cross the Kentucky river.

In the Eden Shale Belt, roads are generally poor except for the trunk highways which are sometimes good, though this is far from universally true. The hilly character of the topography causes the roads to follow either ridges or valleys; in either case, the road winds back and forth, greatly increasing the distance which must be traveled. The winding character of these ridge road is shown in Plate IX. Where such ridge roads cross

valleys, grades are often exceedingly steep and the roads are frequently washed badly. Many of these roads are also very narrow. The roads in the valleys may parallel the creeks, as shown in Plate X, or they may actually be in the creek beds for

Plate XLIII. "Improving" a road in the Eden Shale Belt. Near Normandy, Spencer County.

short distances as shown in Plate XI. This is particularly true for the secondary roads. Most of the main roads traverse the upland, as the creek valleys are narrow, and the better farms are on the ridges.

Bridges over the smaller creeks are frequently lacking and in some cases it is necessary to ford streams of considerable size, as on the Taylorsville Pike from Shelbyville to Taylorsville, where the road crosses Elk Creek at Rivals. In other cases, roads cross creeks on cement causeways which raise the roadway above low water stages of the stream, though the causeway is submerged at flood levels.

In many cases, the roads so called, of the Eden Shale Belt resemble those of the eastern part of the state. Trunk highways which cross this sub-region are often good, but the roads which both originate and terminate in the sub-region are poor. One of the pressing needs of this sub-region is better roads.

In the Outer Blue Grass, a great many miles of excellent road have been built at different times, but even the main roads are usually in only fair condition, as they have quite generally been allowed to fall into disrepair so that they are very rough. In a few cases, where rock asphalt or cement has been used as surfacing and in a few of the limestone pikes of recent construction, this is not true. One of these better limestone pikes is shown in Plate XLI.

Topographic condition in this sub-region being similar to those of the Inner Blue Grass, roads are lacking in heavy grades and follow approximately direct routes between towns. Creeks are bridged in all cases; only the larger streams must be crossed by ferries.

In the Blue Grass, the construction of good roads is proceeding rapidly; in the Inner Blue Grass, the work is nearly completed; in the Outer Blue Grass, it is well under way; only in the Eden Shale Belt are the roads still extremely poor. The variation in the character of the roads in the three sub-regions again emphasizes the justification for the division of the Blue Grass into sub-regions on the basis of differences in development and economic conditions resulting from variations in the physical equipment.

River Navigation

The Blue Grass is bounded on the north by the Ohio and is crossed by the Kentucky and Licking rivers, both streams of considerable size. In addition, the Forks of the Salt River drain the western counties of the area. During the early portion of the history of the Blue Grass, these rivers were important highways (2), this being particularly true of the Ohio and Kentucky rivers, and, to a lesser extent, of the Licking.

At the present time, the only rivers which are used for navigation are the Ohio and the Kentucky. Earlier improvement of the rivers for navigation was by private interests for use in transporting coal and lumber; later the State undertook to construct locks and dams to improve the navigability of the streams. In 1879, the Federal Government took over the control and improvement of the rivers, and since that date, the improvements have been made and the navigation works have been operated and maintained by the United States Engineers' Corps (3)

The Kentucky River has been improved by a series of fourteen locks with an average lift of about 16 feet, which provide 260 miles of slack water navigation. Dam Number 14, at Heidel-

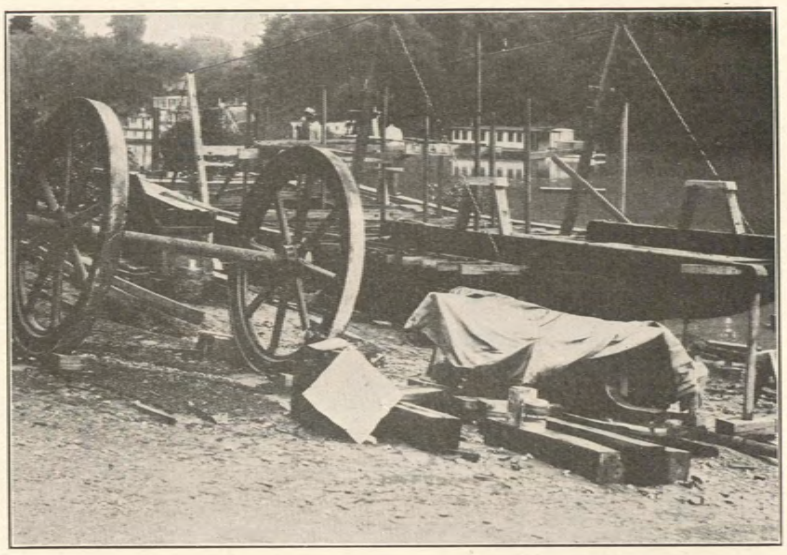

Plate XLIV. Water front at Frankfort. A stern wheel tow boat is shown under construction in the foreground.

berg in Lee County, provides slack water into the border of the coal producing section of eastern Kentucky. In spite of the improvement of the river, it is used only to a slight extent, as the railroad lines which parallel the stream course handle most of the traffic. The decline in the importance of river transportation, both actually and relatively, may be partially the result of lowered freight rates, but it is in larger degree the result of difficulties inherent in water transportation. Every year, transportation on the river is blocked by freshets, ice or drought, whereas the railroads offer uninterrupted service. The principal freight carried on the Kentucky River consists of coal, lumber, and rafts of logs. The fact that slack water does not enter the coal producing area to any considerable extent prevents the extensive use of the river for coal shipments. Lumber is milled within the Mountain Area so that slack water is of only limited utility in

floating out logs. In addition, most of the valuable timber has been cut so that both logs and lumber promise to comprise a continually decreasing percentage of the river borne freight.

Such freight as is handled on the Kentucky River is carried in barges which are towed by stern wheel tow boats of small

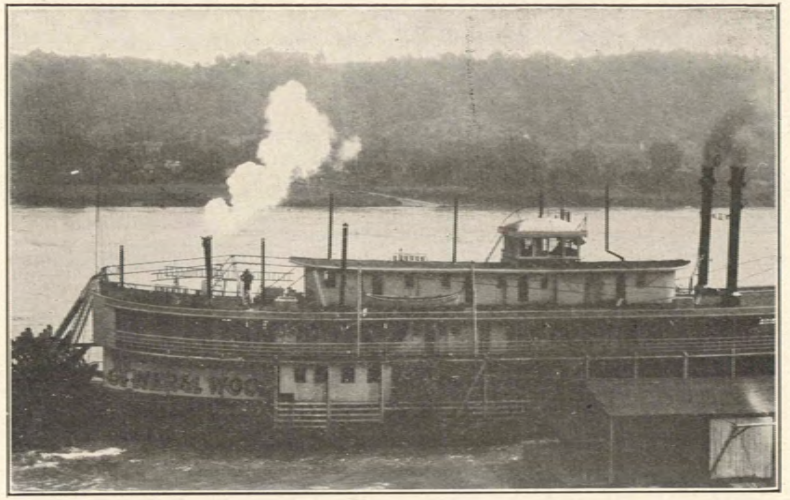

Plate XLV. Ohio River packet boat. The General Wood, on the Cincinnati-Pittsburg run tied up at the wharfboat at Maysville, Mason County.

draft. At Frankfort there are usually a number of these boats tied up along the water front during the summer, at which season many of these boats are idle. A typical water front scene is shown in Plate XLIV. In spite of the declining importance of river navigation, the coal which is handled by river constitutes a rather significant asset to the towns which are so located that they can secure coal which has been transported by water. In addition to the river boats which carry freight, a limited number of pleasure steamers operate on the lower portion of the river.

On the Ohio River, there is a considerable towing trade, the principal freight carried being coal, with some iron and steel. This traffic does not affect the Blue Grass except in the Newport-Covington area. For practical purposes, none of the products which originate in the Blue Grass are shipped by river and none

of the freight handled by river is used in the Blue Grass except coal along the Kentucky River and in the Cincinnati area.

In addition to the freight handled by barges and tow boats on the Ohio River, there are packet boats, such as shown in Plate XLV, which operate regularly, carrying both passengers and freight. These ply between Cincinnati and Charleston, and Cincinnati and Pittsburg, stopping at Maysville. These boats apparently do a good business, securing all the freight which they can handle. Oil for the Maysville area is shipped in largely in this way.

Steam Railroads

Railroads played no part in the early settlement of the Blue Grass, movement of population into the area being either overland or by water routes. Subsequent development was also based on the use of rivers and roads as means of communication, as the area was not only settled but its economic system as well was established prior to rail construction. The building of railroads improved means of communication and afforded new outlets for production, but did not modify the economy of the area essentially.

The staple crops and the agricultural occupation of the Blue Grass are of such a character that the presence of excellent rail communication is not a vital factor in the success or failure of the rural economy. Corn is fed on the farm or marketed near the area of production; the cash crop, tobacco, does not compete with the crop from other areas and has a high unit value, hence it commands essentially uniform prices for comparable grades in all parts of the producing area, irrespective of the character of the rail communication. Industrial development in the Blue Grass is almost entirely lacking except for local manufactures with limited local markets not affected seriously by the character of the rail service. Except on the northern margin, in the Newport-Covington area, the presence of the present adequate transportation system has produced essentially no change in the character of the economic development. The principal effect of improved methods of transportation has been to change the relative importance of the distributing centers within the area, the larger towns gaining at the expense of the smaller centers of population. Lexington in particular has profited in this

respect as the radius of effective communication has been increased by rail and interurban lines and the bus lines which have been made possible by the hard surfaced roads which focus on the city.

Rail construction in the Blue Grass began shortly prior to 1840 but was of relatively small consequence for some time thereafter. By 1860, there were approximately 175 miles of railroad in the Blue Grass or 18% of the present mileage. At the time the first lines were constructed, however, the average density of population was approximately 55 to the square mile which indicates a degree of agricultural use of the land not differing materially from that of the present.

The Louisville and Nashville Railroad, one of the three principal lines of the Blue Grass today, was chartered under the Laws of Kentucky May 5, 1850, but the main stem from Louisville to Geddes, Kentucky, was not opened to traffic until November 5, 1859, (4) and the Blue Grass lines were of still later construction. In similar manner, the lines of the Chesapeake and Ohio and the Southern Railway, including both those which are owned and those with are operated by these systems today, were relatively unimportant prior to 1865.

The period between 1865 and 1885 witnessed the construction of many miles of track in the Blue Grass. By the latter date, the skeleton of the present system had been established. Even at that date, however, Owen, Robertson, Bracken, Washington, Anderson and Campbell counties were without rail communication. The eastern third of the Blue Grass was also poorly served by railroads and none of the present extensions of the Louisville and Nashville Railroad from Winchester to eastern Kentucky had been constructed.

By 1890, the Chesapeake and Ohio Railroad had built east from Cincinnati to Ashland and the Louisville and Nashville Railroad had begun the extension of its lines into the coal fields of eastern Kentucky. Construction in the Blue Grass subsequent to 1890 has been limited in amount and has been confined to the building of spur lines, short connecting lines, and the extension of branches to serve limited sections more adequately.

The foci of rail lines of the Blue Grass are points of intersection of north-south and east-west lines. As the principal

north-south lines diverge from Cincinnati and the major east-west lines from Louisville, the intersections lie mostly either within the Inner Blue Grass or close to its outer margin. The principal junction points are: Lexington, Winchester, Frankfort, Shelbyville, Versailles, Nicholasville, Paris and Georgetown. In the case of Frankfort, Paris and Georgetown, the intersecting lines are branches of the Louisville and Nashville Railroad. Nicholasville, Versailles and Georgetown have, in addition, lines of the Southern Railway System. Lexington and Winchester are the two major foci. Lexington has branches of the Southern Railway, the Louisville and Nashville and the Chesapeake and Ohio Railroads. Winchester has several branches of the Louisville and Nashville, including both those which penetrate the Eastern Coal Field and the main north-south line from Cincinnati. In addition, the line of the Chesapeake and Ohio east from Lexington passes through Winchester. The consequence of this concentration of railroads upon a limited area in the Blue Grass is to create a rail net characterized by a very uneven distribution of mileage among the different counties.

Of the total mileage within the Blue Grass, the Louisville and Nashville owns or operates approximately 60%. Out of the 28 counties of the area having railroad lines, 7 are served only by the Louisville and Nashville and 16 others depend in part upon it for rail transportation, 82% of the counties and 85% of the area depending either wholly or partly upon these lines.

Of the Ohio River cities, the Louisville and Nashville lines enter Louisville, Cincinnati, and Maysville. In addition, Carrollton is connected with the Louisville-Cincinnati branch by a short spur line, the Carrollton and Worthville R. R. From Louisville, one line runs east, with many branches in the Central Blue Grass. In the eastern portion of the area, the various divisions of the Louisville and Nashville which focus on Winchester serve the Kentucky and Cumberland drainage basins of the Mountain Region. From north to south, the Blue Grass is traversed by the line from Cincinnati to Atlanta by way of Knoxville.

These various lines of the Louisville and Nashville afford outlets for the products of the Blue Grass to the north at Louisville, Cincinnati and Chicago; to the west, at St. Louis and Memphis; and to the south, at Atlanta, Birmingham, Mobile and New Orleans.

The Southern Railway System owns or operates approximately 25 per cent of the railroad mileage of the Blue Grass, serving 11 counties in all, either wholly or in part. These lines are concentrated in the western half of the area, west of the Licking River. Next to the Louisville and Nashville, the lines of this system are the most important in the Blue Grass counties. The system consists essentially of the north-south road from Cincinnati through Lexington and Danville to Chattanooga and Birmingham and the line from Louiville to the east, which affords connection with the north-south line at Georgetown, Lexington and Danville.

This system, which serves the west half of the Blue Grass, affords outlets to Cincinnati, Louisville, St. Louis and Chicago to the north and northwest, and to Memphis, Birmingham, Mobile, Atlanta, and Florida points to the southwest, south and southeast.

The lines of the Chesapeake and Ohio Railroad, including both those owned and operated, comprise approximately 15 per cent of the total railroad mileage of the Blue Grass. These lines serve only the northeastern quarter of the area, except as trackage rights over the Louisville and Nashville afford an outlet to Louisville. The lines embrace the one to the east from Cincinnati which follows the south side of the Ohio River through Maysville, where it connects with the Louisville and Nashville line to Lexington, and the line to the east from Lexington through Winchester and Mt. Sterling to the coal fields of eastern Kentucky. Trackage rights over the Louisville and Nashville west of Lexington, as has been indicated, afford entrance to Louisville.

This system does not supply as important outlets for the products of the Blue Grass as do the Louisville and Nashville and the Southern, but it is valuable in that it brings in coal from the Big Sandy Drainage area, in that it supplies an optional route, and outlets to the east from Cincinnati to Baltimore, Philadelphia and New York.

The minor lines which are listed in the accompanying tabulation of the distribution of railroads and railroad mileage by counties are all short and are controlled, either through stock

STEAM AND ELECTRIC RAILROADS IN THE BLUE GRASS

Counties	Total Mileage of Steam and Electric Lines	No. of Sq Mi. of Area Per Mi. of Railroad	Names of Steam Railroads	Names of Electric Lines
Anderson	20.90	9.6	Southern.	
Boone	18.59	13.5	C. N. O. & T. P. (Southern); L. & N.	
Bourbon	54.00	5.6	L. & N.; F. & C. (L. & N.)	K. T. and T. Co.
Boyle	27.78	6.6	Southern; C. N. O. & T. P. (Southern).	
Bracken	29.25	6.9	C. & O.; Brooksville R. R. (C. & O.)	
Campbell	30.00	4.8	C. & O.; L. & N.	
Carroll	27.07	4.8	L. & N.; Carrollton and Worthville (L. & N.)	
Clark	57.74	4.5	C. & O.; L. & N.	
Fayette	93.00	2.9	L. & N.; C. & O.; Southern; C. N. O. & T. P. (Southern).	K. T. and T. Co.
Franklin	42.53	4.6	L. & N.; F. & C. (L. & N.)	K. T. and T. Co.
Gallatin	11.51	9.4	L. & N.	
Garrard	14.20	16.7	L. & N.	
Grant	30.00	8.8	L. & N.; C. N. O. & T. P. (Southern).	
Harrison	24.00	12.9	L. & N.; C. N. O. & T. P. (Southern).	
Henry	36.00	8.4	L. & N.	
Jessamine	39.00	4.4	L. & N.; C. N. O. & T. P. (Southern).	
Kenton	55.00	2.9	L. & N.; C. & O.; C. N. O. & T. P. (Southern).	
Madison	67.00	6.6	L. & N.	
Mason	36.00	6.3	L. & N.; C. & O.	
Mercer	52.00	4.8	Southern; C. N. O. & T. P. (Southern).	
Montgomery	26.00	7.6	C. & O.	
Nicholas	15.00	13.8	L. & N.	
Owen	.....	.....		
Pendleton	29.00	9.6	L. & N.; C. & O.	
Robertson	.....	.....		
Scott	55.00	5.2	C. N. O. & T. P. (Southern); L. & N.; Southern; F. & C. (L. & N.)	K. T. and T. Co.
Shelby	42.00	10.1	L. & N.; Southern; C. & O.	Louisville Interurban
Spencer	14.00	13.2	L. & N.	
Washington	14.00	21.3	L. & N.	
Woodford	47.00	4.1	L. & N.; Southern.	K. T. and T. Co.
Totals and Ave.	1,007.57	7.1		

Data from Poor's Manual of Railroads for 1923 and prior years. (5)
Twenty-Fourth Biennial Report of the Department of Agriculture, Labor and Statistics for Kentucky, pp. 15-134, 1920-1921. (6)
Railroad Map of Kentucky, Ky. R. R. Commission, 1918. (7)

ownership, lease, or otherwise, by the three major railroad systems of the area.

The total railroad mileage for the Blue Grass of 1007.57 miles represents one mile of railroad for every 7.1 square miles of area or .142 miles of line for every square mile of land surface, which is distinctly above the average for the state, though only about two-thirds of that for a state such as Illinois. The great concentration of lines in the Inner Blue Grass, however, gives that sub-region a railroad net of greater density than the average for Illinois.

The railroad net is densest in the Lexington and Covington areas, where roads converge. Only accidentally is there any correspondence between agricultural desirability and the railroad mileage in a given county. Kenton and Fayette counties, for example, have the same number of miles of railroad per square mile of area yet are very dissimilar in topography, soils and agricultural prosperity. As a group, the counties of the Inner Blue Grass have the greatest average railroad mileage, though this is not the result of their greater desirability or agricultural prosperity, but a function of their central location. Only two counties, Owen and Robertson, have no railroads, which results from their location off an air line route between important urban centers. Even in these areas, however, no farm is more than 16 miles from a railroad in an air line.

Service for the Blue Grass was only an incidental object in the construction of the main railroad lines; termini are to the north, south and west. Construction through the Blue Grass resulted largely from the fact that the area was on the route to the south, and that topographic barriers were lacking. Only the branch lines were built to serve the area.

Although poorer transportation facilities would not alter agricultural practice, which was established before railroads were constructed, it has been fortunate for the region that railroad lines were built through it. To change an economic system which has been established for a century or more without an infusion of new blood is difficult. In the Blue Grass, however, there are signs of the alteration which is certain to come. With the coal of eastern Kentucky near at hand, with much undeveloped hydro-electric power unused, with markets at home and

nearby, easily accessible by rail and river, industrial development is almost certain to increase in amount.

Interurban Lines

Interurban lines are confined entirely to the Inner Blue Grass except for the line from Louisville to Shelbyville, in the Outer Blue Grass. With this one exception, all interurban lines focus upon Lexington. All of these lines follow main traveled pikes. To the northeast, the electric line parallels the Maysville Pike to Paris; to the north, it follows the Georgetown Pike to Georgetown; to the west, the interurban line utilizes the route of the Versailles Pike through Versailles to Frankfort; and to the south, the electric line extends to Nicholasville along the Nicholasville Pike. Winchester alone of the nearby urban centers is not connected with Lexington by trolley. Service is frequent and good and the lines are well patronized. Focusing as they do upon Lexington, they serve to extend the limits of the retail trade area of that city appreciably.

Bus Lines

The Lexington area is also well served by bus lines, a fleet of twenty buses of the Reo Bus Line covering central Kentucky on a regular schedule. These run every hour to Winchester, and at somewhat less frequent though regular intervals, to Harrodsburg and Danville; to Mount Sterling by way of Winchester; to Nicholasville, Bryantsville and Lancaster; to Richmond, where connection is made with a line to Berea; to Midway; to Lawrenceburg; to Cynthiana; and by way of Paris, to Millersburg and Carlisle, from which place buses run to Flemingsburg. There is also a line operating from Georgetown and Owenton to Frankfort. In addition, Lexington is connected to Louisville by bus lines which run through Versailles, Frankfort and Shelbyville. Within the Lexington area, every town of appreciable size within a radius of thirty miles has bus connection with Lexington, and by way of Lexington, with Louisville as well.

In the northern portion of the Blue Grass, similar bus lines operate out of Maysville, Covington and Newport. Out of Maysville, they are of lesser importance than in the Lexing-

ton area; in the Newport-Covington district, they afford suburban transportation for the workers of the Newport-Covington area in addition to extending the area of the retail districts of those places.

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6. Twenty-Fourth Biennial Report of the Bureau of Agriculture, Labor and Statistics of the State of Kentucky, pp. 15-134, 1920-1921.
7. Railroad Map of Kentucky. State Railroad Commission, 1918.

CHAPTER VI.

MINERAL WEALTH AND THE MINERAL INDUSTRIES

The mineral resources of the Blue Grass are not extensive, being limited to a few minerals, mostly non-metallic, the mining of which does not constitute one of the important industries of the area at the present time, though opportunity for a considerable expansion of production apparently exists. The principal minerals of the Blue Grass are: building stone and road building material, phosphate rock, calcite, fluorite, barite, clays, sand, water and possibly oil and gas, though probably not in commercial quantities. In addition, lead and zinc ores occur in association with the calcite, fluorite, and barite deposits.

Building Stone and Road Building Material

The larger portion of the stone of North Central Kentucky suitable for structural purposes occurs in the Inner Blue Grass. The thin bedded and often shaly limestones of the Eden Shale Belt are of very limited utility for construction, though quarried for road ballast. Even in the Outer Blue Grass, the limestones are seldom found in beds of such character as to furnish first class structural stone, though they do find use locally both in building and in road making. The quarries of the Blue Grass area, which Richardson lists in his "Building Stones of Kentucky," show by their distribution the dominance of the Inner Blue Grass in the production of limestone to be used as building material and road ballast. (1)*

Stone quarried for construction work is mostly from the Highbridge stage of the Champlainian Series, and to a lesser extent, from the Lexington stage of the same series. Above this last named horizon, there is no stone of any great structural importance quarried in the Blue Grass. The beds of these stages which are worked for building material and road ballast will be discussed in the order of their geological succession.

The Oregon bed of the Highbridge furnishes an even textured, fine grained, dolomitic limestone which is buff colored and

*Numbers in parenthesis refer to the bibliography at the end of the chapter.

often mottled in appearance. It is commonly known as "Kentucky River Marble" from its area of outcrop along the Kentucky River from Boonesboro to Clifton. The Clay's Ferry Quarry, southwest of Lexington and near Clay's Ferry, and the Grimes' Mill Quarry, at Grimes' Mill on Boone's Creek, produce in part from this and in part from the immediately overlying formation, the Tyrone. These quarries are about 12 or 13 miles from Lexington, in which place much of the building material produced has been marketed. Some has also been barged down the Kentucky River to Frankfort. According to Miller, the columns of the old State House at Frankfort are built of this stone (2).

Overlying the Oregon bed, is the compact, thick bedded, light colored Tyrone limestone, which on fractured surfaces shows facets of calcite. These have given to the rock the name "birdseye limestone." Richardson applies the name "Kentucky Marble" to the building stone quarried from this bed (3), as the stone is a semi-crystalline limestone or "marble," which weathers white, presents a very pleasing effect, and is very durable. Buildings constructed over a century ago of this stone still stand in good condition. The bed outcrops in the same general area as the Oregon bed which underlies it, but in addition, extends below Frankfort to the mouth of Steele Branch. Quarries in this bed have been worked for many years to supply the need for building stone at Frankfort and the vicinity. This stone was used in the construction of the Old State House, the Penitentiary walls, and many of the more pretentious homes in Frankfort. In addition to its value for building construction, it finds use as curbing, paving, road and railroad ballast, and in various other ways. In this building stone, the area possesses an asset of great value.

Immediately overlying the Tyrone is the Lexington limestone which is grayish in color and much used for foundations and occasionally for walls of buildings in the area of outcrop near Lexington. This limestone is also used in the construction of the stone fences so common in the Inner Blue Grass. In building these walls, blocks are laid in a horizontal position and then the wall is capped by a layer of thinner blocks set on edge at an angle as shown in Plate XXXV.

In many places, the beds of the Cincinnatian Series supply limestone of a character satisfactory for certain types of construction such as retaining walls. These limestones, in areas where the layers are thick enough, are even used locally for building construction. As a source of supply for more than local needs, however, the limestones of this series possess little value.

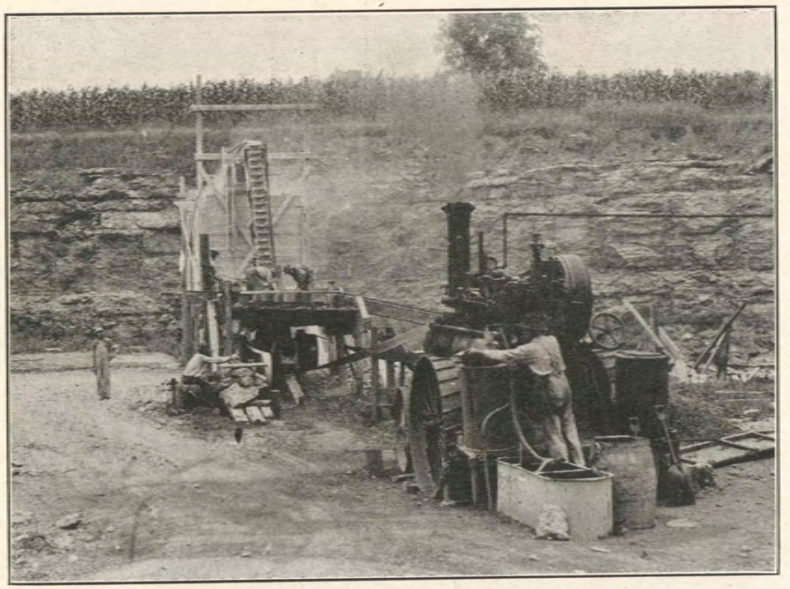

Plate XLVI. Quarry and stone crusher. Quarrying and crushing Lexington limestone for use in road construction. At junction of Clear River and Shannon River Pikes and the Versailles Pike west of Lexington.

The construction of good roads in the Blue Grass has resulted in the opening of many new quarries and the reopening of old ones to supply crushed stone for railroad ballast, for the building of macadamized pikes, and for supplying foundation material for those roads which are surfaced with rock asphalt or concrete.

Almost any of the limestones of the Blue Grass can be used for road construction, though where the stone is merely broken

and spread on the road as shown in Plate XLIII, the softer limestones are preferable to the harder stone of the Highbridge Series, though the latter are more satisfactory if a roller is used to smooth the surface of the road after the application of the stone. For railroad ballast, the Highbridge limestones are best.

At the present time, the number of quarries in the Blue Grass counties exceeds 250, every county having at least one quarry. In Fayette County alone, there are 37 quarries, most of which have been opened to secure road building material. Much stone is also quarried along the Ohio River, particularly in Mason County, where 35 quarries have been opened. Quarries tend to be most numerous in the areas where road construction is most active, along the lines of the railroads, and in the Inner Blue Grass, where much high grade rock is available for the quarrymen.

In addition to the uses already enumerated, the limestones of the Blue Grass afford a source of supply for a good quality of building lime and ground limestone for use in agriculture.

Phosphate Rock.

The exceptional fertility of the soils of the Inner Blue Grass is the result of the fact that that they have been derived by the decomposition of highly phosphatic limestones. In this region, some of the thinner layers of the unleached rock contain calcium triphosphate in the form of shell casts (4). In places, this calcium phosphate has been concentrated into commercial deposits, either by leaching out of the phosphate from overlying layers and deposition at lower levels by replacement, or by the formation of residual deposits by the leaching out of the calcium carbonate of the limestone.

Mining of these phosphate deposits is at present carried on only at Wallace in Woodford County, though other deposits of commercial extent probably exist in the area wherever the Woodburn bed outcrops in areas of fairly level topography so that concentration of the phosphatic material has been possible. Commercial deposits may occur, therefore, in portions of northern

Woodford and Jessamine counties, in southern Franklin and Scott counties, in western Fayette County, and in central Bourbon County.

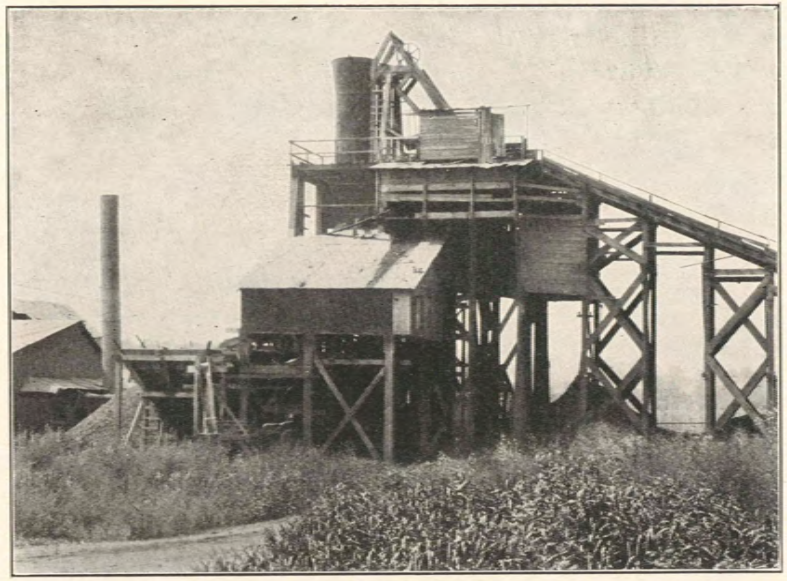

Plate XLVII. Phosphate mining plant. The rock from the workings is hauled up the incline to the top of the washer in which the clay, sand and rock are separated. Near Wallace, Woodford County.

Discovery of the deposit at Wallace occurred in 1915 as a result of digging post holes. Subsequent investigation of the deposit revealed its commercial possibilities and led to the formation of the Central Kentucky Phosphate Company. This company has since become merged with the United Phosphate and Chemical Company. With few interruptions, phosphate rock has been mined from this deposit since the inauguration of the enterprise. At present, the output is about 1800 tons of rock per month.

The amount of overburden is small so that stripping is not expensive. The phosphate rock is mined by steam shovel, loaded on cars, and hauled on tracks by locomotives to the washer shown in Plate XLVII where it is freed from clay and separated into

sand and rock. Water for the washer is obtained from a small creek. The rock is dried and ground and then mixed with the phosphate sand, which shows by analysis a lower phosphate content than the rock. At first, all of the product was disposed of as crude phosphate rock and some is still sold in that form, though the larger portion is now marketed as fertilizer after having been treated with sulphuric acid. Though a considerable area of this deposit has been worked, much rock still remains to be mined.

Fluorite, Calcite, Barite and Lead and Zinc Ores

Veins of fluorite, calcite and barite, together with the associated ores of lead and zinc, are confined to the Inner Blue Grass. In the past, some of these minerals have possessed commercial significance though none are mined at the present time. The decline of the mining industry has been the result of transportation difficulties and other factors not associated with the character of the deposits as such (5)

Fluorite occurs as solid veins in the Highbridge limestone along the Kentucky River, though few veins of much extent are known. It has been mined from the Faircloth vein at Mundy's Landing on the Woodford County side of the Kentucky River, though the deposit is not being worked at present.

Calcite occurs similarly as solid veins in the Highbridge limestone along the Kentucky River. The only vein which has been worked is located at Mundy's Landing on the Mercer County side of the Kentucky River. This vein is from six to sixteen feet wide and has been traced back from the river for a mile. The calcite was ground, barged to Highbridge, and from there, shipped by rail. Mining operations are suspended at present as at the fluorspar mine across the river.

Barite occurs as a filling of fissure veins in the Lexington limestone. The veins range in width from a few inches to twenty feet, with one to three feet as average widths. In outcrop, the veins frequently extend several miles. Barite has been mined in Fayette, Jessamine, Garrard, Woodford, Clark, Bourbon, Scott,

Franklin, and Owen counties, though none is being mined at present. The plant at Nicholasville where the rock was prepared for market has been largely dismantled, though it is reported that operations will probably be resumed.

Lead and zinc ores commonly occur in association with fluorite, calcite and barite in the mineral veins, though usually in very small quantities. Attempts have been made to secure lead and zinc from these veins in the past but without much commercial success, though for a time mines were operated on the Kentucky River near Gratz in Owen County and at Kessinger near the Scott-Franklin county line.

Clays

The clays utilized in industry in the Blue Grass consist of surface clays of Pleistocene age, represented by alluvial deposits, Ordovician shales of the Eden formation, and residual clays derived from Ordovician limestones. Their use is limited to the manufacture of common brick. Clay using industries in the Blue Grass other than the brick plants ship in clays from other portions of Kentucky or from other states. The accompanying tabulation gives the location and name of the manufacturing plant, the origin of the clay used and the products manufactured.

The brick plants using residual clays produce a red brick which is marketed locally. The plant at Nicholasville, which will serve as a type, has a capacity of 1¼ to 1½ million brick per year. Clay is obtained from a pit near the plant. The Nicholasville plant uses wood for drying and coal for burning the brick. Wood is obtained from Mt. Vernon as a cost of $3.00 per cord, which makes the use of wood economical.

The larger portion of the brick manufactured in the Blue Grass is made from alluvial clays in the Ohio River district. At Maysville, the two plants, both of which use flood plain clays, have a combined daily capacity of 75,000 to 85,000 brick. (6) Shipping facilities are good here as both plants are on the Chesapeake and Ohio Railroad. In addition, the Louisville and Nash-

CLAY WORKING INDUSTRIES OF THE BLUE GRASS

Brick Plants.

Name of Firm	Location of Plants	Character of Clay Used	Products
Lexington Brick Co.	Lexington	Residual clay	Common brick
Schneider and Sons	Nicholasville	Residual clay	Common brick
Culbertson Brick Co.	Winchester	Residual clay	Common brick
Sphar Brick Co.	Maysville	Alluvial clay	Common, pressed & rough texture brick
Maysville Brick Co.	Maysville	Alluvial clay	Common brick
Busse Brick Co.	Covington	Alluvial clay	Common brick
Broering and Meier	Covington	Alluvial clay	Common brick
Carrollton Brick Co.	Carrollton	Alluvial clay	Common brick
Floor and Wall Tile Plants			
Alhambra Tile Co.	Newport	Mixture of clays from Kentucky and other states.	Plain, embossed and dull finished enamel tile, terra vitrea and faience tiles.
Cambridge Tile Mfg. Co.	Covington	Clays from other states and sagger clays from the Purchase Region of Kentucky.	Ceramics or small tile of different color for floors. Bright and matte glazed wall tile, with either flat or embossed surfaces and of plain white or different colors.

ville Railroad reaches Maysville from the south and the products can be shipped by water as well. The brick from the Covington plants, which also utilize flood plain clays, are sold largely in the Cincinnati-Covington area. The Carrollton plant also disposes of most of its product locally.

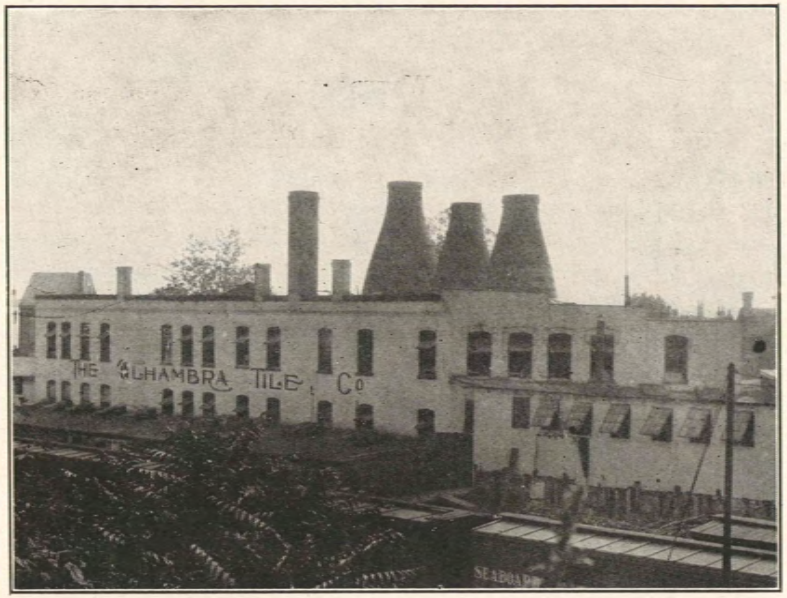

Plate XLVIII. The Alhambra Tile Company. Newport, Campbell County.

The tile manufactured at Newport and Covington is used for ceramic mosaic floors, tiled walls and trim, wainscoting and other decorative work. It bears an excellent reputation and has been marketed and used widely both in Kentucky and adjacent states.

Sand

Neither the geological history nor the underlying rocks of the Blue Grass are of such a character as to supply extensive deposits of sand, so that except along stream courses, commercial deposits are lacking. In few places, except along the Ohio River, is the mining of sand of any considerable commercial importance.

At Carrollton, sand is mined from bars in the Ohio River by clam shovel or pumped from the river bottom. It is then either shipped directly or first screened. The sand mined in this way is suitable for use in plaster, morter, and concrete. It is also a good molding sand and is used for that purpose. (7) The sand is marketed both locally and at various river points, as at Louisville.

Water

The water resources of the Blue Grass constitute an extremely valuable asset, as the numerous ponds, springs, and brooks in certain portions of the area contribute to the desirability of the region for stock raising. The resource is also of present or potential value in furnishing public water supplies, in industrial use, for the development of hydro-electric power, and for several other purposes of lesser importance.

Most Blue Grass towns depend upon surface water for drinking purposes and for domestic use. The cities which can draw upon the larger rivers, as Covington, Newport and Maysville on the Ohio, Frankfort on the Kentucky, Danville on the Dix, and Lawrenceburg on the Salt River, have a dependable, though not in all respects a satisfactory source of supply. In the larger centers of population not so located, as Lexington, it is necessary to rely upon storage reservoirs or "lakes" in order to supply the demand during periods of dry weather. A few of the cities depend upon springs, as Georgetown, or upon wells, as Carrollton, and some of the smaller towns have no waterworks. The waterworks may be either privately or publicly owned and operated and the percentage of the population of a given place dependent upon the public water supply varies from 95% in the larger cities, as Lexington, to as low as 50%, as at Carrollton.

Improvement is possible in many places in guarding the source of supply from contamination and in filtering and chemically treating the water before use, as even under the most favorable conditions, many of the sources of supply are not very satisfactory, especially during prolonged periods of drought in mid-summer.

Water finds many uses in industry, so that a satisfactory supply is important in determining the location of manufacturing plants. Some of the industrial plants draw upon the city mains; others have developed their own water supply. In general, the water for industrial use should be soft in order to prevent the formation of boiler scale. In the distilling industry, the character of the water supply was exceptionally important as it affected the quality of the product. The quality of the condenser water is not as important as the quality of the water used in making ice, but a sufficient supply must be available. Both quantity and quality of the water are, however, important from the standpoint of the general utility of water in industry.

In the Blue Grass, the Kentucky River and its tributaries appear to offer the most promise for hydro-electric development. The other rivers, as the Licking, fluctuate too widely in volume or are too small to afford opportunity for any considerable or profitable development.. On the Kentucky River, as at present improved by navigation dams, about 25,000 h. p. could be developed without difficulty, an average of 1,800 h. p. at each dam. At Dam No. 4 alone, at Frankfort, 2,800 h. p. is being wasted at present. (8) If the power plants were operated under a single system, output could be regulated to suit the demand.

There is now under construction on the Dix River near High Bridge a power plant in which will be installed equipment for developing approxinmately 25,000 h. p. The water to operate this plant will be impounded behind a 275 foot dam only 750 feet in length, which will form a lake 25 miles long. When completed, this will be the first large hydro-electric development in Kentucky.

An apparently attractive opportunity for development also is afforded by Elkhorn Creek about three miles from its junction with the Kentucky River. It is estimated that it would be possible to generate at least 4,000 h. p. at this site. (9) Other possibilities in the Blue Grass represent much smaller developments.

The water from some of the springs carries considerable salt in solution, such springs being known as "salt licks." These

furnished salt for the settlers during the pioneer period. The most celebrated of the salt licks are Big Bone Lick, near the Ohio River in Boone County, and the Upper and Lower Blue Licks in Nicholas County. All of these are in the Licking River Valley.

In some cases, the springs are highly mineralized and the dissolved salts impart medicinal value to the water. Salt-sulphur water has been encountered in wells in Carroll County at Saunder's Station and at Frankfort and in the immediate vicinity. In other portions of the Blue Grass, the water from certain springs contains gypsum and magnesium sulphate in solution. Dry Ridge, in northern Grant County, lays claim to being the "Carlsbad of America."

Recreational facilities are provided by the rivers, the several bathing beaches along the Kentucky River being patronized quite extensively. Principal of these is the one at Boonesboro, which is easily accessible by good roads from Lexington and Winchester, as well as from several other smaller urban centers. At Boonesboro, a considerable number of cottages have been built, and in the summer, and especially on holidays, it is the scene of considerable activity.

Oil and Gas

Oil and gas production has been and probably will be of minor significance in the Blue Grass. Some oil has been secured by drilling, but the amount has been too small to be of commercial importance. In the past, there has been a small production of gas in Shelby, Franklin and Gallatin counties, and oil is reported to have been secured near Wheatly, in Owen County. In the summer of 1923, when field work for this report was done, drilling was in progress both in Gallatin and Montgomery counties, though no paying wells have been brought in as yet, so far as is known.

The mineral wealth of the Blue Grass serves only to supplement the more important resources of the area. The total mineral production has been small and of relatively little significance in affecting the character of the development, neither does it promise to modify the economy of the area fundamentally in the future.

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CHAPTER VII.

CITIES AND MANUFACTURES

Urban centers in the Blue Grass represent foci for areas of variable size, the extent of the area for which a given town serves as the market determining the size of the urban development. County boundaries tend to be so located that the focus for the highways is also the geographical center of the county and the location of the county seat. No towns, so far as known to the writer, have been established as county seats with a location central to a county subsequent to or at the time of formation of the county, though subdivision of a county has frequently resulted in an accession of population in a previously established town as the result of its designation as the county seat of a newly organized county. In many cases, such towns are not located at or near the geographical center of the county for which they serve as county seats, though they are favorably located as regards accessibility by road. Danville furnishes an illustration of a county seat so located. In a few cases, the formation of new counties has displaced an existing county seat from its former central location with reference to the county, as in the case of Harrodsburg, which is located near the southern margin of Mercer County, though it possessed a central location with reference to the county which it served prior to the formation of Boyle County. (See tabulation on page 7.)

Though urban development in the Blue Grass has not been restricted by unfavorable topographic conditions limiting the number of locations suitable for cities, certain sites have been hampered by or profited from topographic conditions. Along the Ohio River, Newport, Covington, and the suburbs of these cities are located on river terraces at or near the junction of the Licking River with the Ohio, one of the relatively few places along the Ohio River on the Kentucky side where city growth is possible, as access to the upland from the margin of the Ohio is difficult even where streams such as the Licking furnish an approach. Where such an approach is lacking, grades are prohibitive. In addition, few other locations along the

Ohio afford enough level land free from flood danger to allow any considerable expansion of population. Maysville suffers from this handicap of an insufficient area of level land. Newport and Covington enjoy freedom from flood danger, possess room for expansion, and have fairly easy access to the upland, therefore considerable urban development has been possible.

After reaching the upland, roads and railroads avoid the larger rivers except where crossing becomes necessary, hence cities located on the larger streams are not common. Frankfort constitutes an exception, but the location on the Kentucky River has been more of a handicap than an advantage in that it has limited the area of level land on which the city can expand, determined the direction of growth, and made both approach to and egress from the city difficult because of heavy grades. Only the fact that it is the State Capital has made possible a partial overcoming of the handicap. River highways do not carry any considerable fraction of the trade of the area, hence are not now a determining factor in city location. In addition, the fact that they are deeply intrenched has, as indicated previously, still further decreased their value as a factor in city location.

Most of the cities of the Blue Grass, aside from Frankfort and the Ohio River cities, are located on the more level portion of the upland. In the Inner and Outer Blue Grass, topographic conditions are such that a great number of satisfactory sites occur. In the Eden Shale Belt, towns are commonly located on the wider portions of the ridges, where many ridge roads converge. In such a town as Kelat, in Harrison County, the effect of the convergence of the ridge roads is very apparent. In other cases, where ridges widen greatly, the convergence of the roads from the subordinate ridges is not so obvious.

Except for Covington and Newport, the larger urban certers are county seats and exhibit to a greater or lesser degree the characteristic of being built around the court house square. It is probable that all were so laid out originally, and that where there is an apparent departure from this plan, it has resulted from an extension of the business section on one of the streets so that it has assumed more importance than the others which mark off the court house square. In Lexington, for example,

Main street has outgrown in importance as a business street the other streets which border the square, though at an earlier period in the history of the city, Upper street, Short street, and Cheapside were nearly, if not equally important business streets. In a few places, as at Mount Sterling, the business section has grown away from the court house square even more completely, so that the main street of the town does not form one side of the square. At Frankfort, the State Capital, both the fact that topographic condiitons have determined the direction of city growth and city plan and the fact that the State Capital is located there have resulted in a city plan different from that characteristic of the towns of the Blue Grass.

The towns and cities of the Blue Grass may be classified in five groups, the division being based upon the variation in function of the different urban centers. The first group embraces the cities and towns of the northern margin, along the Ohio River, particularly Newport, Covington, and their suburbs, in which industrial development reaches a maximum for the area. These cities serve the Blue Grass only incidentally.

A second group of urban communities, quite different in character, consists of those cities of the Inner Blue Grass which serve as distributing points for the Blue Grass and a portion of the Mountain region. Lexington and Winchester belong in this class. They derive their importance from the fact that rail lines radiate in such fashion that they can serve considerable areas adequately as distributing centers. Such cities have manufactures of only minor importance, being primarily retail and wholesale centers.

The third class of towns embraces the places which are primarily county seats, serving the needs of limited communities. The population of these towns varies greatly, from 585, as at Brooksville in Bracken County, to 5,099 at Danville in Boyle County. This variation in size is determined by the extent and character of the tributary area. In the smaller towns, rail communication may be poor or even lacking, as at Owenton in Owen County; in the larger places, as at Danville in Boyle County, a minor railroad center may be developed. This class of towns is characteristic of the Outer Blue Grass.

In addition to the urban centers, properly speaking, a large number of minor population groups have developed, particularly in the Eden Shale Belt. The 1920 census lists a total of over 100 incorporated towns, mostly very small, in addition to which there are many more of almost equal importance, though unincorporated. These cross-roads centers serve limited areas and derive their importance from a location where roads intersect.

Plate XLIX. A view at Keene. A typical unincorporated center, Jessamine County.

In addition to the four classes enumerated, Frankfort falls into a class by itself. Railroad construction to the city was assured by the importance of Frankfort as the seat of the state government. This has led to considerable industrial development which is not warranted by the physical setting of the city.

In common with other portions of Kentucky, the Blue Grass region is not characterized by extensive urban development, though the number of urban centers increased steadily from 8 in 1870 to 19 in 1920, which number is nearly 40% of the total number of urban centers in Kentucky. A rather striking feature of the increase is that out of these 11 new urban centers, 4 are in the Newport-Covington area.

Of the urban population in 1920, slightly over 50% was concentrated at the junction of the Licking and Ohio rivers and approximately 33% in the Inner Blue Grass. The remaining 17% was all in the Outer Blue Grass. The great increase in the number of urban centers and the large percentage of total urban population of the Blue Grass in the Newport-Covington area have resulted from industrial development in that region. The concentration of urban centers in the Inner Blue Grass is the consequence of the favorable location of the area with reference to rail routes, which enables these cities to serve satisfactorily as distributing centers.

Growth of the total urban population has not been rapid and no city has enjoyed phenomenal growth during any single decade, many of the towns showing slight declines in population for certain decades. (See the accompanying tabulation of city growth by decades.) During the half century terminating in 1920, the entire increase in the urban population in the Blue Grass was approximately 146,000. Of all the Blue Grass cities, Winchester has enjoyed the greatest percentage of increase, the increase in no decade since 1870 being less than 16%, and the maximum being nearly 100%, between 1880 and 1890. This steady growth has paralleled rail extension to the east and the opening of the coal fields of eastern Kentucky.

The accompanying tabulation shows the concentration of urban centers in limited areas, the slow increase in the total urban population, and the rates of increase for individual urban centers.

In the discussion of the individual urban centers, both within and marginal to the Blue Grass, the towns are considered in the order of size and importance in the sub-regions, rather than in groups as described.

Lexington, which memorializes by its name the first battle of the Revolution, was settled April 1, 1779. (1)* It was incorporated as a town by the Virginia Legislature in 1782, and as a city by the Kentucky legislature in 1832. By 1802, Lexington was the metropolis of the west, (2) with two newspapers printed twice a week, and manufactures embracing paper, rope, powder, pottery, and leather. By 1817, the list of manufactured products

*Numbers in parenthesis refer to the bibliography at the end of the chapter.

POPULATION CHANGES IN THE URBAN CENTERS OF THE BLUE GRASS BY DECADES 1840-1920

Towns	County	1920	1910	1900	1890	1880	1870	1860	1840
Bellevue	Campbell	7,379	6,683	6,332	3,163	1,460	.....	.....	.....
Covington	Kenton	57,121	53,270	42,938	37,371	29,720	24,505	16,471	2,026
Cynthiana	Harrison	3,857	3,603	3,259	3,016	2,101	1,771	1,237	.....
Danville	Boyle	5,099	5,420	4,285	3,766	3,074	2,542	4,962	.....
Dayton	Campbell	7,646	6,979	6,104	4,264	3,210	1,749	.....	.....
Fort Thomas	Campbell	5,028	.....	.....	.....	.....	.....	.....	.....
Frankfort	Franklin	9,805	10,465	9,487	7,892	6,958	5,396	3,702	1,917
Georgetown	Scott	3,903	4,533	3,823	Not. ret.	sep.	.....	1,684	.....
Harrodsburg	Mercer	3,765	3,147	2,876	3,230	2,202	2,205	1,668	.....
Lexington	Fayette	41,534	35,099	26,369	21,567	16,656	14,801	9,521	6,997
Ludlow	Kenton	4,582	4,163	3,334	2,469	.....	.....	.....	.....
Maysville	Mason	6,107	6,141	6,423	5,358	5,220	4,705	4,106	2,741
Mount Sterling	Montgomery	3,995	3,932	3,561	3,629	2,087	1,040	754	.....
Newport	Campbell	29,317	30,309	28,301	24,918	20,433	15,087	10,046	.....
Nicholasville	Jessamine	2,786	2,935	2,393	2,157	2,303	1,089	800	.....
Paris	Bourbon	6,310	5,859	4,603	4,218	3,204	2,655	1,440	.....
Richmond	Madison	5,622	5,340	4,653	5,073	2,909	1,629	845	.....
Shelbyville	Shelby	3,760	3,412	3,016	2,679	2,393	2,180	811	.....
Winchester	Clark	8,333	7,156	5,964	4,519	2,277	1,616	.....	.....
	Totals	215,949	199,446	167,719	137,289	106,207	82,970	.....	.....
	Total urban population	215,949	199,446	165,326	132,663	91,384	69,691	.....	.....

(Data from U. S. Census.)

had increased greatly, the total capital invested in industry at that date being £467,225. (3).

The central location of Lexington with reference to the entire area has been of paramount importance in the growth and importance of the city. Not only has the central location with reference to the entire area been important, but the relation of the sub-regions of the Blue Grass is such that a city site located centrally with reference to the Blue Grass as a whole occupies an extremely favored location in the heart of the best agricultural region of Kentucky, the Inner Blue Grass. In addition to an excellent location, topographic conditions are such that an excellent city site is provided, sufficiently diversified in topography to be pleasing, but not hilly so that development is hampered.

Lexington is the focus upon which the roads of the primary system of state and federal highways of the area converge. These highways are all hard surfaced roads and divert to Lexington the trade of a considerable area. The operation of bus lines on these highways, together with the transportation afforded by the interurban lines which parallel them, has resulted in increased importance for Lexington. In addition to serving as a focus for roads, Lexington is a major railroad center for the Blue Grass, every railroad which serves the area entering the city. This combination of excellent roads and good rail communication, both by interurban and steam road, has been responsible for the present size of the city and the extent of its merchandising and manufacturing interests.

At a very early date Lexington was a city of considerable size, the population as early as 1810 being 4,326. By 1840, the population had increased to 6,997, and by 1860, to 9,521. By ten year periods thereafter the population was 14,801, 16,656, 21,567, 26,369, 35,099 and 41,534. Growth has not been rapid, but it has been steady; during no decade has there been a loss in population. The growth of population has not resulted from industrial development, but has been the accompaniment of the steady increase in population of the entire area and the extension of the trade territory of Lexington by improved methods of transportation.

Lexington's retail trade is drawn from approximately two-thirds of the Blue Grass counties, which have a total population of nearly 300,000, or 12% of the population of the state. The result of control of this large retail trade territory, in which the

Plate L. Tobacco warehouse. Lexington, Fayette County.

per capita purchasing power is high, has been to build up a retail center of very high character. (See frontispiece.) Lexington's wholesale trade is also highly developed and the area covered is much more extensive than that covered by the retail trade. The wholesale trade territory embraces the major portion of the Blue Grass, together with much of eastern Kentucky and portions of Tennessee, an area with a total population of approximately 1,000,000.

Lexington is not highly industrialized, though the growth of industry has made some progress during the past decade. The two most important industries are milling and refining. Railroad shops and the tobacco industries also employ many men. In addition, there are a considerable number of small industries of diversified character, the manufactures of which include

candy, cigars, brick, brooms, mattresses, ice cream, soft drinks and various other products.

The relatively small importance of industry is emphasized by the fact that the two most important manufacturing establishments, the Lexington Rolling Mills and the Great Southern Refinery, employ only about 75 men each.* The following tabulation shows the growth of industry during the decade ending in 1919.

GROWTH OF INDUSTRIAL DEVELOPMENT IN LEXINGTON
1909-1919

Year	No. of Establishments	Wage Earners Average Number	Primary H. P.	Wages	Cost of Materials	Value of Products
1919	170	1,171	4,042	$1,227,000	$4,930,000	$8,570,000
1914	112	1,130	2,211	638,000	1,849,000	3,531,000
1909	85	1,032	2,579	511,000	1,249,000	2,851,000

(Data from U. S. Census.)

Manufacturing development has not been accompanied by the employment of much female labor, on account of the character of the industries. The products of the manufacturing plants are destined in larger part for rather local markets. Future industrial development, if it occurs, will be characterized by a more diversified list of manufactures, and in all probability, such manufacturing development will be accompanied by a greater absorption of female labor in industry.

Lexington is so located that many raw materials, as cotton and tobacco, are available for manufacture. Distribution of the finished products is assured by excellent rail communication. High grade coal is close at hand in eastern Kentucky and hydro-electric power will be available from the development on the Dix River (See page 159) and additional power can be generated on the Kentucky River. It is improbable that Lexington

*Authority of Mr. Price Gaines, Secretary of the Lexington Board of Commerce.

will become highly industrialized in the near future, but some expansion of industry may be expected.

Plate LI. A typical court day scene. Cheapside, Lexington, Fayette County.

Lexington is a beautiful residence city. The older portions of the town present the charming characteristics of southern architecture of pre-war days, with houses set close to the shaded street line. The newer sections are characterized by wide streets flanked by modern residences such as shown in Plate LII. The principal streets are paved, of good width, and except in the newer portions of the city, are well shaded. Of late there has been considerable high class suburban developmnt, which is favord by climatic conditions and the excellent roads of Fayette County.

As a residence city, Lexington leaves little to be desired. The city is equipped with all modern conveniences; it is situated in the center of an attractive as well as prosperous agricultural area; and it is surrounded by many places of great historical interest, easily accessible over excellent roads. The University of Kentucky, Transylvania College, Sayre College, Hamilton

College, and a number of other schools, both public and private, provide excellent educational facilities. Lexington is exceptionally fortunate, both in its physical setting and the character of the present development.

Plate LII. View on South Hanover Street, Lexington, Fayette County.

The name of Frankfort is supposed to commemorate the killing of Stephen Frank in 1780, at or near the present site of the city. (4) Frankfort is built on the terrace which borders the Kentucky River, well above high water stages. This terrace is approximately 300 feet below the level of the upland and is flanked by limestone cliffs which in most places rise precipitously from the level land on which the city is built so that few advantageous approaches to the upland are afforded.

For a location on the Kentucky River, however, the site possesses several important advantages. At Frankfort there is a considerable area of level land bordering the river, as the crecentric valley formerly occupied by the Kentucky River at the time it flowed at a higher level, furnishes sufficient level land for considerable expansion. Fort Hill, which overlooks the city from the north, marks the northwestern margin of this old valley, in which the state penitentiary is located. The fact that this valley represents an abandoned river channel was recognized

as early as 1817, Zadock Cramer describing the river at Frankfort in the Navigator as having "an appearance of having left its old bed" and the abandoned valley as a "fracture by some great convulsion of nature." Approach to the upland is also relatively good, Benson Creek furnishing a fairly good approach to the terrace level from the west, and to the east, the upland can be reached by utilizing either Glenn's Creek or the relatively good approach from the south on the east side of the Kentucky River. In addition to the relatively favorable topographic conditions, the Kentucky River is narrow at Frankfort, which facilitates bridging and allows the city to expand on both sides of the river.

Despite these relatively favorable topographic conditions, the direction of growth is controlled absolutely by the location of the level land. With the present population, this has not led to undue attenuation of form, but any considerable growth must be accompanied by an extension of the city either up or down stream or expansion toward Thorn Hill in the abandoned meander. Either of these alternatives is accompanied by manifest disadvantages. Natural conditions are such that the location of a settlement at an early date at or near this point was inevitable, but the conditions which made the site desirable for the initial settlement do not favor any considerable present day urban development.

The town was established by the Virginia legislature in 1786, but its early growth was slow. In 1790, the census returns do not show the population, but by 1800, it had become the second city in size in Kentucky, with a population of 628. This was the result of the removal of the seat of government from Lexington to Frankfort in 1793. By 1810, there were about 140 houses and a population of 1,099. Printing offices and mercantile establishments had been started and some manufacture had begun. The early growth of the city was associated with the importance of the city as the State Capital. By 1820, the population was 1,617, and by ten-year periods thereafter, 1,987, 1,917, 3,308, 3,702, 5,396, 6,958, 7,892, 9,487, 10,465 and 9,805. The construction of railroads resulted in a considerable increase of population between 1840 and 1880 and there has been some growth since the latter date. Frankfort, however, is not as important relatively

as in earlier days, and it is improbable that it will regain this former relative importance. Aside from ease of access by river, Frankfort possesses no natural advantage not enjoyed by other Blue Grass cities, and its handicaps are such that they offset this advantage. As the State Capital, growth of population may be expected to continue slowly, but as a major population center, the town probably has no future.

Frankfort was established before the construction of railroads, with the river and roads as the means of communication. During its early history, the river functioned in an important way in carrying trade, and even today, considerable bulky freight, such as coal, is transported by water. A typical water front scene at Frankfort is shown in Plate XLIV.

On account of its location, together with topographic conditions in the surrounding area, Frankfort is not as important a focus for roads as Lexington, though access to the city over good roads is possible from both and east and west directions, and roads of lesser importance run to various sections of the Eden Shale Belt, on the margin of which Frankfort is located.

The construction of east-west rail lines across the Blue Grass, to connect Louisville with eastern Kentucky and the north-south lines from Cincinnati, necessitated the crossing of the Kentucky River, the exact place of crossing being determined by the location of Frankfort. If the present location of Frankfort had not been the site of a considerable city and the State Capital, it is doubtful whether the lines would have crossed at this point or descended to the terrace level in making the crossing. Much of the early rail construction actually was an attempt to make the State Capital more accessible. As early as 1838, the Lexington and Ohio Railroad, one of the first in the state, was in operation between Lexington and Frankfort. Subsequent construction, from which the present rail net has resulted, linked up these early roads, thus placing Frankfort on a major east and west route, which has been of great benefit in the development of industry in Frankfort.

The business section of the city and the Old Capitol building are located on the north side of the Kentucky River where the early settlement began. In common with many other Blue Grass cities, the retail section is much more highly developed, both as to

its extent and the character of the stores, than is common in many other sections of the United States. A view of the main business street, which shows the narrow streets characteristic of old Frankfort, is shown in Plate LIII.

Plate LIII. Main business street of Frankfort, Franklin County.

Manufactures embrace shoes, twine, furniture, brooms, shirts, gloves and various minor products. The manufacture of shoes employs approximately 500, 60% of whom are women. The product is marketed in both the south and the northwest. The second largest employer of labor is the hemp factory, with about 125 employes. The twine produced is marketed through jobbers in Boston and San Francisco. In both of the preceding industries, the raw materials are not obtained locally, except in small part. Other industries, aside from those associated with the penitentiary, as the making of chairs, brooms and shirts, are small employers of labor. Present manufacturing development has been based upon a local reservoir of labor, not on nearness to raw materials or a market for the finished product. Only limited development along present lines may be expected.

In common with many other of the older Blue Grass cities, Frankfort possesses great historic interest and the charm inseparable from these older communities. South of the Kentucky

River, the streets and most of the houses resemble those of any other city of comparable size, but in old Frankfort, the narrow streets with the houses built to the sidewalk edge, and even the wider streets with houses such as shown in Plate LIV, are very attractive.

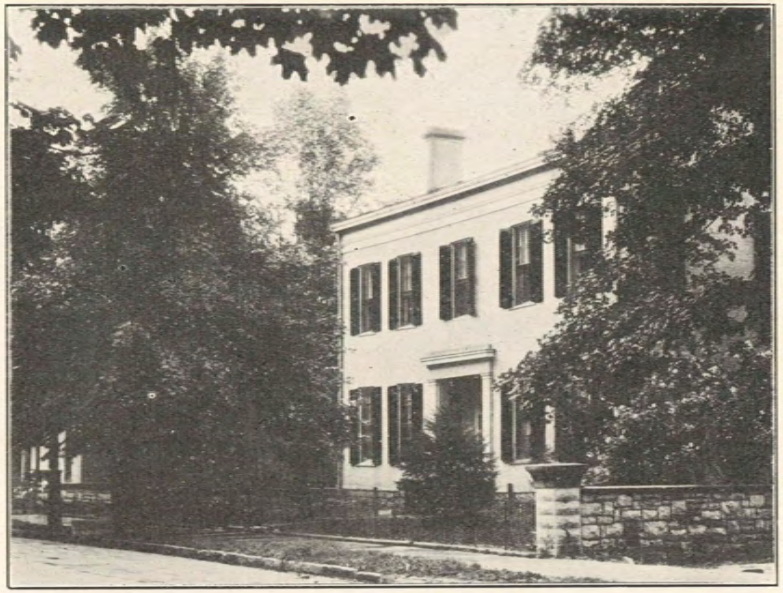

Plate LIV. Typical old southern home in Franfort, Franklin County.

Superimposed upon old Frankfort are the modern conveniences, such as electric lights, sewer and water systems, pavements, and all the other improvements which go to make a modern city. Built on both sides of the Kentucky River, with the towering limestone cliffs of Fort Hill rising abruptly back of the Old Capitol building, and apparently shut in on all sides except for the narrow approaches utilized by the railroads, with many quaint old buildings, Frankfort is an urban center of great appeal and charm.

In addition to Lexington, Frankfort, and the Ohio River towns which are marginal to the Blue Grass, several of the county seats are urban centers by census definition.* In none of these smaller urban centers is industrial development important,

*By census definition, the term urban center is limited to towns with a population of 2,500 or over.

the communities functioning principally as markets and distributing points. The fact that they are in all cases county seats is an additional factor in their importance, both directly and indirectly.

These smaller urban centers are confined to the Inner and Outer Blue Grass, though many of them, as Georgetown, serve a fraction of the hilly Eden Shale Belt as well as a portion of the sub-region in which they are located. They differ considerably in size, the importance of a given place varying with the extent and character of the tributary area. Towns in too close proximity to Lexington and Frankfort, as Versailles, are of lesser importance than those on the outer margin of the Inner Blue Grass, as Winchester. In the Outer Blue Grass, several fair sized towns, as Richmond, Mount Sterling and Shelbyville, have developed.

Winchester, with a present population of 8,333, is the third city in size in the Blue Grass, if the marginal Ohio River cities are not considered. Its steady early growth, from its incorporation in 1793, resulted from its location as a center for a considerable compact area of good agricultural land on the margin of the Inner Blue Grass. The present size and importance of Winchester are, however, in large part due to the excellent rail communication enjoyed (See page 142), which has greatly enlarged the extent of the tributary area and enabled some industrial development to occur.

The city serves as an important wholesale and retail center, particularly for the area to the east and southeast, the trade of the Kentucky River drainage area of eastern Kentucky naturally focusing in considerable part upon Winchester as a result of the convergence of rail lines from the east.

The principal manufactures embrace flour, lumber and millwork, brick, tobacco hogsheads, gas engines, farm machinery, foundry products, soft drinks and brooms. The flour milling industry, with 100 employes, is the largest employer of labor, with approximately 35% of all labor employed in industry.* Manufactures have been increasing, and in view of the accessibility of coal for power, raw materials for manufacture, nearness to

*Statements as to industries and number of employees are upon the authority of E. G. Kingsbury, Secretary of the Winchester Chamber of Commerce.

market, and the presence of an abundant supply of labor, expansion may be expected. This will probably involve the development of industries employing female labor. At present, however, Winchester is primarily a residence city, with a good retail trade, some wholesale business, and with apparent opportunity for some expansion of industry based on existing opportunity.

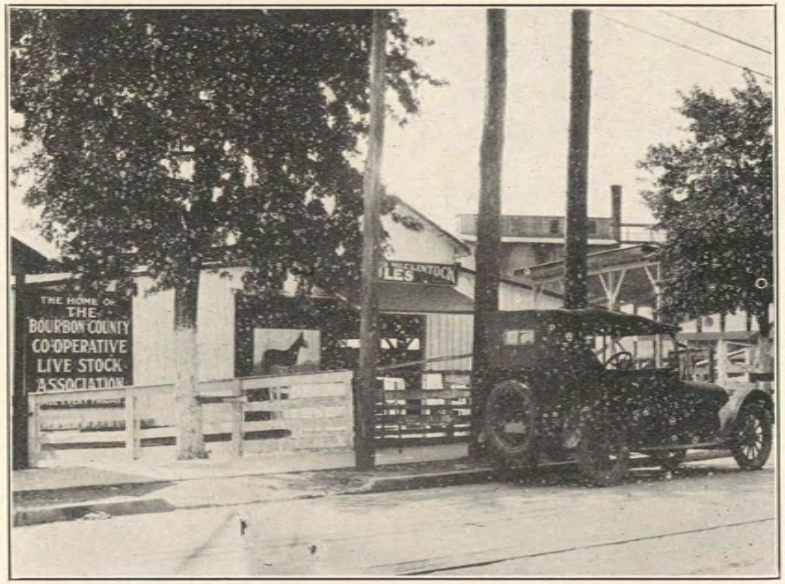

Plate LV. Stock yards at Paris, Bourbon County.

Paris, the county seat of Bourbon County, is one of the older communities of the Inner Blue Grass. It was established by the Virginia legislature in 1789 (5), under the name of Hopewell; its present name was received in 1790. Its location in the heart of one of the best counties of the Inner Blue Grass is responsible for its steady, though gradual growth. By 1870, the population was 2,665, and by ten-year periods thereafter 3,204, 4,218, 4,603, 5,859 and 6,310.

The excellent surfaced roads which focus upon Paris make it the logical retail center for the entire county. In addition, the dominance of the live stock industry in the agricultural economy of the county has resulted in the development of a rather ex-

tensive market for stock. Manufactures, however, are virtually absent, being confined to the milling of wheat raised locally. Neither the local resources nor the distributing facilities hold forth much promise for future growth of industry. As in most of the Blue Grass county seats, the basis for development is laid in the prosperity of the agricultural community which is served,

Danville, the county seat of Boyle County, is located on the southern margin of the Inner Blue Grass and serves as a center for a very good agricultural area in both the Inner and Outer Blue Grass, which are here separated by only a narrow belt of the Eden Shale. From the date of its establishment in 1787, the population increased steadily, until in 1920, Danville was a town of 5,099.

The growth of population has resulted in major part from the increasing population and prosperity of the agricultural community, though the location at the junction of the Southern Railway and the Louisville and Nashville has had some effect in producing growth and developing a minor center for the wholesaling of groceries and hardware. Industrial development, aside from the milling of flour from local wheat, is lacking.

Danville is one of the more attractive of the county seats of the Inner Blue Grass counties, with excellent stores, wide, well kept streets, some of which are paved, and many fine residences.

Center College and the Kentucky College for Women furnish adequate educational facilities. The great agricultural wealth of the community served insures to Danville a definite future prosperity comparable to that of the past, but no rapid growth based on industrial development.

Harrodsburg, the oldest of the county seats, first of Lincoln and then of Mercer County, is the oldest town in the state. (6) By 1870, the population had increased to 2,205 without railroad facilities nearer than sixteen miles. The increase in population between 1870 and 1920 was only 1,560, the result of this relatively small and gradual growth being that the town retains the characteristics of the pre-war period more completely than do most of the Blue Grass county seats. The large number of older homes, the persistence of the court house square in the city plan, and the age of the community lend it great attractiveness.

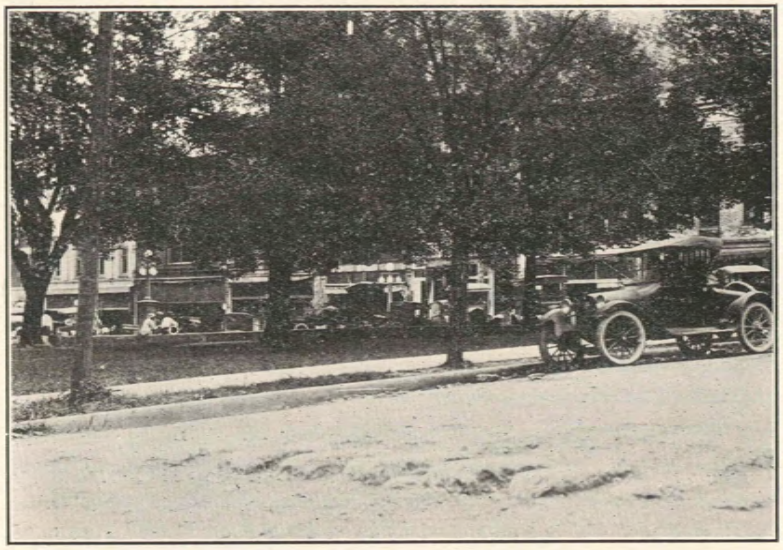

Plate LVI. The business section of Harrodsburg, Mercer County. Court house square at the left, "stepping stones" in the foreground.

Georgetown, located on the northern margin of the Inner Blue Grass on the edge of the Eden Shale Belt, was settled in 1775, though not known as Georgetown until 1790. (7) As the county seat of Scott County, the town serves the needs of the agricultural community. There being no other basis for growth, the increase in population has been very slow.

Cynthiana, the county seat of Harrison County, had a population of 3,857 in 1920. The tributary territory embraces a portion of the Inner Blue Grass, on the northern margin of which the town is located, and a considerable area in the Eden Shale Belt.

Nicholasville, with a population of 2,786 in 1920, is centrally located with reference to Jessamine County, of which it is the county seat. Though too close to Lexington to profit fully by the fact that it is the center of a good agricultural area in the Inner Blue Grass, it has enjoyed a slow growth of population since the date of its settlement in 1812.

Richmond, with a population of 5,622 in 1920, is the largest urban centers in the Outer Blue Grass, as the result of the fact that it is the county seat of the largest of the Blue Grass coun-

ties, together with its location in one of the largest areas of good agricultural land in the sub-region. It also serves considerable area marginal to the Blue Grass.

In addition to being a retail center of some importance, Richmond is an important live stock market on account of the importance of the feeding industry in Madison County. Considerable quantities of poultry are also marketed.

Although founded at an early date, much of the growth has been recent enough to produce a town of somewhat different character from that of many of the older Blue Grass communities. The presence of the Eastern Kentucky State Normal and Teachers College, with an enrollment of approximately 2,000, also modifies the character of the community.

Mount Sterling, the county seat of Montgomery County, located in the Outer Blue Grass, grew very slowly up to 1872, the date of construction of the Lexington and Big Sandy Railroad, now the Chesapeake and Ohio. Subsequent to 1872, growth was more rapid, the relatively recent growth being evidenced by the character of the community.

As in other Blue Grass county seats, the major dependence is on the rural community, manufactures being limited to tobacco, gloves, pasteboard boxes and corrugated fiber lunch boxes, all small and relatively unimportant.

Shelbyville in 1920 had a population of 3,760, almost entirely dependent upon the agricultural community of Shelby County for which it is the county seat. It is located in the Outer Blue Grass in a desirable agricultural area and serves as a market and retail center.

In addition to the towns which may properly be classed as urban centers, there are many smaller county seats which have essentially the same basis for existence as the larger Blue Grass towns, the smaller size resulting either from the poorer character of the area which they serve, as in the Eden Shale Belt, or the smaller size of the tributary area, as in the Inner and Outer Blue Grass. These smaller county seats vary in population from a few hundred, as Brooksville in Bracken County (population 585), and Owenton in Owen County (population 971), to the size of Versailles in Woodford County (population 2,061), and Lancaster in Garrard County (population 2,166). In

addition to the fact that their basis for existence is similar to that of the other Blue Grass county seats, which makes detailed consideration of each of these smaller towns unnecessary, the limits of this discussion of urban development in the Blue Grass preclude the possibility of a separate characterization of these smaller communities.

The Ohio River towns are only nominally Blue Grass urban communities, their size and importance being only in part dependent upon their location with reference to the Blue Grass region, this being particularly true for the Covington-Newport urban center. In addition, their location is, strictly speaking, outside the area of Ordovician outcrop. In view of the fact that they are located in counties which are included in the Blue Grass, however, it has seemed best to outline their basis for development and their salient characteristics.

Covington is the second city in size in Kentucky, with a population of 57,121 in 1920. If the entire group of cities at the junction of the Licking and Ohio rivers is considered as one urban aggregation, Covington becomes a portion of a population group of over 110,000, nearly three times the size of Lexington and approximately half the size of Louisville.

Newport, the second largest unit of this group, has a population of 29,317, and together with its two suburbs, Bellevue and Dayton, a population of 44,342, only slightly less than that of Covington. Although Newport was founded in 1795, or 20 years prior to the establishment of Covington, its growth has been less rapid than that of Covington as a result of a less favorable location.

Covington and Newport are both located on river terraces at the junction of the Licking and Ohio rivers, on opposite sides of the Licking River. These terraces afford excellent sites for urban development as they furnish considerable areas of level land, largely free from flood danger. The area of level land west of the Licking River is somewhat larger than that east of the river, within the corporate limits of Newport, which has allowed Covington to expand to better advantage.

The Covington-Newport area is one of the major foci for rail lines in the state of Kentucky as it profits not only by those lines which diverge from Newport and Covington, but from

those which converge upon and radiate from Cincinnati as well. In addition to the excellent rail communication enjoyed, the Ohio River furnishes a secondary, though important means of assembling raw materials for manufacture. Highways from the south converge upon the area, and though mostly rather poor at the present time, they are being improved rapidly. With the completion of these roads, there should be a considerable diversion of retail trade to this district.

Both Covington and Newport enjoyed a steady growth of population up to 1900, but since that date, the population of Newport has been essentially stationary. In part this has resulted from the limitation imposed on expansion by topography, but to some degree it is due to the greater opportunity afforded by Covington. The accompanying tabulation of population growth in Covington, Newport and the two principal suburbs of Newport, Bellevue and Dayton, indicates that expansion of population has continued in Covington, although it has stopped in Newport, largely because of the physical setting, as expansion has continued in the suburbs of Newport, where level land still affords opportunity for the growth of residential sections.

GROWTH OF POPULATION IN COVINGTON AND NEWPORT WITH ITS PRINCIPAL SUBURBS—1860-1920

Cities	1920	1910	1900	1890	1880	1870	1860
Covington	57,121	53,270	42,938	37,371	29,720	24,505	16,471
Newport	29,317	30,309	28,301	24,918	20,433	15,078	10,046
Bellevue	7,379	6,683	6,332	3,163	1,460	381	.....
Dayton	7,646	6,979	6,104	4,264	3,210	1,749	.....

(Data from U. S. Census.)

The requirements of the local population have resulted in the development of considerable retail sections in both Covington and Newport, though nearness to Cincinnati, to which both of the cities on the Kentucky side of the river are connected by bridges, has hampered somewhat the growth of retail trade. Much of the northern half of the Blue Grass area is reached more effectively from the Covington-Newport center than from the cities of the Inner Blue Grass, both on account of the distance involved and the rail connections. This has led to the establishment of wholesale houses to serve the needs of the northern Blue Grass.

The manufactures of Newport embrace foundry products, sheet metal and wire specialties, lumber and mill products, bread and bakery products, enamel and other varieties of tile, commercial truck bodies, and a considerable number of items of lesser importance. In 1919, there were a total of 81 plants with 2,350 employees, and the value of the finished products amounted to $16,935,000, an increase of $10,444,000 over the value of the finished products in 1909.

The industries of Covington are very similar in character to those of Newport, including 14.2% of the state's entire foundry and machine shop products, bread and bakery products, and lumber and planing mill products, stated in the order of their importance. In addition, clay products, tobacco, clothing, cordage and twine, and a considerable list of minor manufactures contribute to increase the volume of industry. The total number of employees in the 133 plants in 1919 was 4,038, of whom 15% were females. The value of the total production in the same year was $17,121,000, which represents approximately 200% of the value of the 1909 production.

This group of urban centers has witnessed industrial development similar to that which has characterized other Ohio River cities in northern Kentucky. Both rail and water routes afford ease of assembly of raw materials for fabrication, cheap coal for the development of power, and distribution of the manufactures to good advantage. Ability to draw upon a large reservoir of labor has also undoubtedly been an important factor in development, leading to a duplication on the Kentucky side of the river of the industries established and operating with success in Cincinnati.

The industrialization of Covington and Newport has led to an expansion of the population into suburban communities which have developed along the Ohio and Licking rivers wherever there is sufficient level land for a town site. Bellevue, Dayton, West Covington, Ludlow, Bromley and Latonia represent such expansions. Clifton, Southgate and Highlands represent similar developments on the level upland.

The Covington-Newport area possesses such manifest advantages for industrial development that a continued expansion of industry accompanied by a steady growth of population may be expected. This expansion will probably result in a multiplication of the suburban developments, which have been made possible by the hard surfaced roads and the automobile. In the future, with increasing industrialization, female labor will doubtless find employment in larger degree.

Maysville is located on the Ohio River, 61 miles above Cincinnati and 91 miles below Ashland by river, at the mouth of Limestone Creek, which gave the landing or town its early name of Limestone, in general use up to about 1793. (8) The city is built on a river terrace sufficiently elevated so that it is seldom subject to overflow. The terrace is narrow so that Maysville is very attenuated in plan, consisting in many places of but a single street, much as in many of the towns in eastern Kentucky. Wherever the town has spread laterally, streets rise one above another very abruptly.

Maysville is connected with Lexington and all parts of the Blue Grass by the Louisville and Nashville Railroad and the Chesapeake and Ohio, which parallels the Ohio River, affords an outlet to Cincinnati to the west and to Ashland and other eastern points. In addition, packet steamers plying between Pittsburg, West Virginia points, and Cincinnati serve the community.

The town serves as a retail center for Mason County and for portions of the bordering counties. The considerable retail trade enjoyed, drawn from a rather extensive area, has been one of the major factors in the steady, though gradual growth to the present population of 6,107.

In common with other Ohio River towns, a higher degree of industrialization exists than in towns of the Inner and Outer Blue Grass of comparable size. Manufactures embrace brick, cotton cord and twine, wood split pulleys and flour. This higher degree of industrial development at Maysville results from a favorable location with reference to transportation facilities and to the location marginal to an industrialized area.

Maysville does not possess advantages as to location which will lead to the development of a major urban center. In addition, the site of the city is such as to preclude any considerable growth without extreme attenuation in form. Even now, the town and its industries extend three or four miles along the Ohio River. In consequence of these handicaps, although the future will probably witness a slow growth of industry and population, Maysville will remain a secondary center among the Ohio River towns.

Carrollton, the county seat of Carroll County, is located on the Ohio River, immediately at and above the mouth of the Kentucky. It was incorporated in 1794 under the name of Port William, by which name it was known for thirty years. The location at the river junction is of small present-day importance, as the Kentucky is not used extensively for navigation. Manufactures are of minor importance and limited in number. The town serves as the retail center and market for the county, but its present size and slow growth of population from 2,205 to 2,281 between 1900 and 1920, indicate its relative importance among the Ohio River cities.

The character and extent of the present urban development in the Blue Grass forecast the importance and character of the future city growth within the area. The small size, relatively slow growth, and small degree of industrialization of most of the towns is characteristic in an area where agriculture is the dominant economic activity. As the permanency of agriculture is not threatened, and as other opportunities are lacking which will decrease seriously the relative position of agriculture in the economy of the Blue Grass, it is probable that future urban development will differ but slightly from that of the past.

The consequence of the location of the Blue Grass and the absence of topographic barriers has been to develop a few major foci of transportation lines, which are in a few cases river ports as well. This has resulted in considerable difference in the prospects for future urban growth in the sub-regions of the Blue Grass.

The Inner Blue Grass, with the two major rail foci of the Blue Grass proper, Lexington and Winchester, is the most highly favored of the sub-regions as regards possibilities for future industrialization and growth of urban population. The county seats in this sub-region which do not possess any distinct ad-

vantage as to accessibility, however, will probably grow very slowly in population and change very little in character.

In the Eden Shale Belt, no marked increase in urban population may be expected. The towns in this sub-region serve rather limited areas which in many cases are of decreasing agricultural desirability under the present unwise use in crop production. These smaller centers will probably never possess manufactures of significance, but will serve instead as distributing centers and markets for the tributary agricultural area. The improvement of roads which is occurring will enlarge the extent of the trade territory of some of the larger communities and result in increases of urban population in these more favored centers, provided cropping systems are altered sufficiently to allow the increase in area to offset the loss in tillable land which is occurring at present.

The urban communities of the Outer Blue Grass do not appear to possess possibilities which will lead to any marked change in size or character. As centers of good agricultural areas, they will doubtless witness a slow but steady growth as the needs of the agricultural community increase.

In the Blue Grass, as in other portions of Kentucky, the maximum opportunity for urban development is present on the northern margin of the area, along the Ohio River. Where transportation lines focus upon the Covington-Newport district, a line of contact of unlike areas, and a marginal location with reference to the industrialized area to the north, the most diverse possibilities and the greatest opportunity for future industrial development and for the growth of urban population centers occurs. The Covington-Newport urban aggregation, with a present population of over 110,000, should have a considerable future of expansion before it. The other Ohio River towns possess, in much lesser degree, the same possibilities.

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CHAPTER VIII.

POPULATION AND WEALTH

Population

The total number of inhabitants of the thirty counties which lie in major part within the Blue Grass region was 1,011,277 in 1920, or the average density of population was slightly over 140.4 to the square mile as compared to a state average of 60.1. If incorporated urban centers are omitted from consideration, the rural districts show an average density of population of 110.1 to the square mile as contrasted with a state average of 44.3. (1)* This high density of rural population reflects the great agricultural desirability of the area. It has been made possible through soil and climatic conditions favorable for the growth of tobacco, which involves much labor and yields high returns per acre under cultivation.

The sub-regions show great differences in the density of both urban and rural populations. In the Eden Shale Belt, the population is entirely rural, and in the Outer Blue Grass, except along the Ohio River, over 90% of the people live outside of incorporated towns with populations of 2,500 or over. In the Inner Blue Grass, the percentage of urban population is greater, but it does not rise above 25%, except in Fayette County, where the percentage increases to 44.7%. Rural populations vary from a minimum density of 66.1 per square mile in Owen County in the Eden Shale Belt, to a maximum of 190.6 in Fayette County, in the Inner Blue Grass. The Inner Blue Grass has an average density of rural population of over 140 to the square mile, but in the Eden Shale Belt and the Outer Blue Grass, average rural population densities are approximately 75 and 85 to the square mile respectively. These variations in population density result from soil and topographic differences in the sub-regions. The Inner Blue Grass, with its excellent soils and gently rolling topography, has the greatest density of population. In no Blue

*Numbers in parenthesis refer to the chapter bibliography at the end of the chapter.

Grass county, however, even in the Eden Shale Belt, does the density fall to the state average of 44.3 to the square mile.

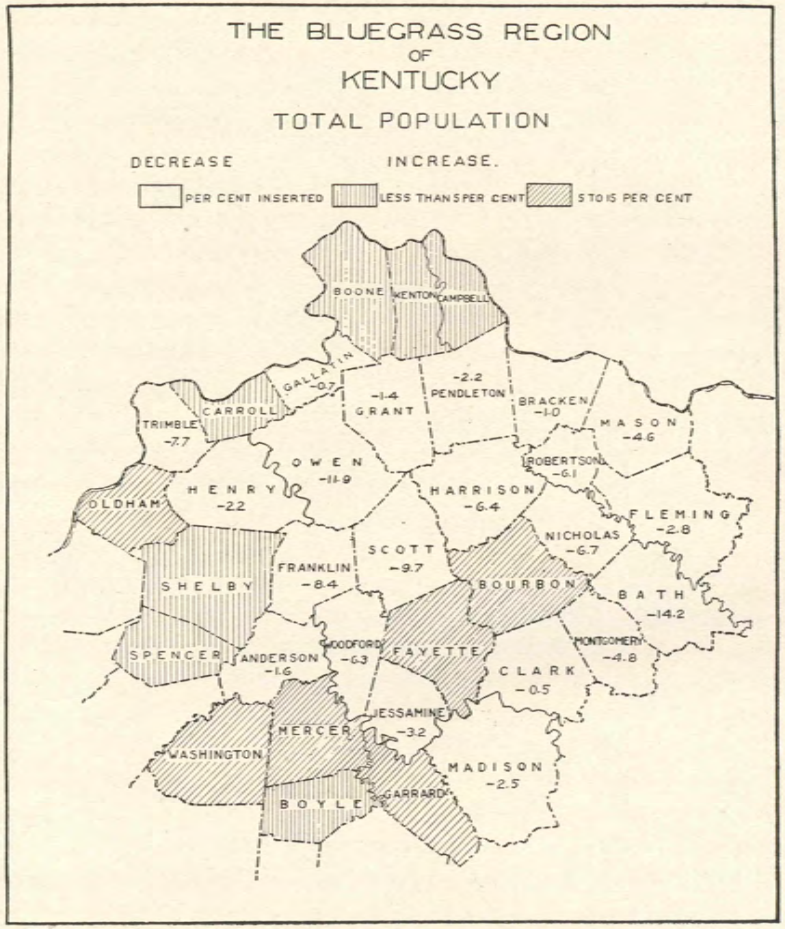

Fig. 6. Density of Population (Total Population).

All that portion of the population residing outside of incorporated places with populations of 2,500 or more is defined as rural. As early as 1810, Lexington had reached this population, and by 1850, Covington, Newport, Maysville, Frankfort and Danville also had populations of over 2,500. Although urban centers were in existence at an early date, such centers did not increase rapidly in numbers, and in the Eden Shale Belt are lack-

ing even today, as has been discussed previously. Between 1850 and 1920, only 13 towns, in addition ot those previously enumerated, passed 2,500 in population and of these, four were suburbs

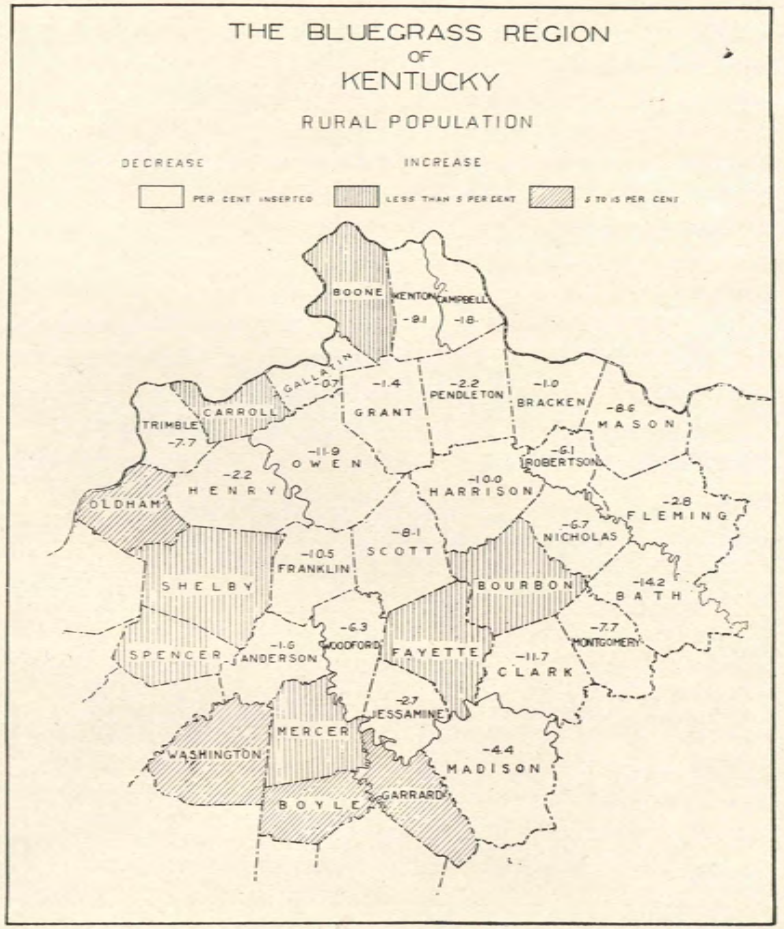

Fig. 7. Density of Population (Rural Population).

of Covington and Newport, so that for the Blue Grass proper only nine towns increased sufficiently in population between 1850 and 1920 to be classed as urban centers. Of these nine new centers, six were in the Inner Blue Grass and three in the Outer Blue Grass.

The 19 urban centers in the Blue Grass in 1920 constitute 37% of all the urban centers in the state, though the urban

population of the Blue Grass constituted only 21.3% of the total population as compared with a state average of 26.2%. This results from the fact that few of the urban aggregations of the Blue Grass are of considerable size.

The movement of population into the Blue Grass was very rapid and occurred at an early date. By 1810, the total population had increased to 216,863 or 30.1 to the square mile; by 1840, the total had reached 288,898 and the density per square mile had increased to 40.1. The consequence of this rapid movement of population into the area at such an early date was that the land was occupied prior to the great wave of European immigration between 1850 and 1860, which was, therefore, diverted to other sections of the country. This has resulted in an increase of population subsequent to 1840, almost entirely genetic in character, this being particularly marked away from the Ohio River. Within the past decade, there has been some infiltration of population from the northern margin, but this has been small in amount as yet.

TOTAL POPULATION BY DECADES—1850-1920

Counties	1920	1910	1900	1890	1880	1870	1860	1850
Typical Inner Blue Grass Cos.								
Fayette	54,664	47,715	42,071	35,698	29,023	26,656	22,599	22,735
Jessamine	12,205	12,613	11,925	11,248	10,864	8,638	9,465	10,249
Woodford	11,784	12,571	13,134	12,380	11,800	8,240	11,219	12,423
Typical Outer Blue Grass Cos.								
Henry	13,411	13,716	14,620	14,164	14,492	11,066	11,949	11,442
Madison	26,284	26,951	25,607	24,348	22,052	19,543	17,207	15,727
Shelby	18,532	18,041	18,340	16,521	16,813	15,733	16,433	17,095
Typical Eden Shale Belt Cos.								
Grant	10,435	10,581	13,329	12,671	13,083	9,529	8,356	6,531
Owen	12,554	14,248	17,553	17,676	17,401	14,309	12,719	10,444
Pendleton	11,719	11,985	14,947	16,346	16,702	14,030	10,443	6,774

(Data from U. S. Census.)

All counties increased rapidly in population up to 1850, this increase being essentially rural in character, as the combined populations of Newport and Lexington, the two urban centers,

was only 15,299, whereas the total population of the Blue Grass was 339,299 in 1850. Since that date, however, the population of many counties had remained stationary or even suffered a decline where essentially rural in character. The accompanying tabulation of population changes shows the changes in total population by decades in typical counties of the three sub-regions of the Blue Grass.

Over the entire period, 1850 to 1920, in both the Inner and Outer Blue Grass, the population has shown a general tendency to increase gradually and regularly, but in the Eden Shale Belt, population has decreased consistently since 1880. This decrease in the Eden Shale Belt is due to the failure of urban centers to develop and the decrease in the desirability of the land for agricultural use with abuse in crop production. It is an accompaniment of the decrease in number and increase in the size of the farms in these counties. The decreases which occurred in practically all counties in the other two sub-regions during the past decade resulted from the general shift of rural population to urban centers. In the Inner Blue Grass counties with larger urban centers there has, therefore, been no loss in total population such as suffered by Jessamine and Woodford counties.

The present white population of the Blue Grass consists essentially of descendants of those settlers who occupied the area prior to 1850. In 1920, more than 99% of the white population was native born. (2) The absence of any considerable infusion of new blood has produced a white population of great homogeniety. In five counties, the foreigh born population comprised .1% or less of the white population, and in only five did it exceed 1% in 1920. Except for Fayette County, all of these five counties were Ohio River counties and all five are sites of major urban centers of the Blue Grass region.

It is necessary to keep in mind the fact that few new elements have been introduced into the population for many years, except in the larger cities, in order to understand fully the lack of a critical attitude toward existing conditions which is so prevalent in much of the Blue Grass region.

Of the foreign born, approximately 50% live in the Covington-Newport area. Fayette and Franklin counties also, with 1.6% and 1.1% of foreign born white population respectively,

are above the average for the Blue Grass in the percentage of foreign born. The present distribution of foreign born is probably indicative of the character of such penetration of the area as may occur in the future. It is not probable that there will be any marked increase in the number of foreign born on the farms, as the rural area is already populated almost to its limits

RACE AND NATIVITY OF THE POPULATION—1920

	Native White	Native White Native Parentage	Native White Foreign Parentage	Native White Mixed Parentage	Foreign Born White	Negroes	Indians, Chinese, Japanese etc.
Anderson	9,363	9,323	10	30	7	612	....
Boone	8,995	8,401	351	243	100	477	....
Bourbon	13,429	13,002	268	159	90	4,898	1
Boyle	11,704	11,466	140	98	104	3,190	....
Bracken	9,787	9,122	386	279	110	313	....
Campbell	57,102	40,387	10,492	6,223	3,829	934	3
Carroll	7,889	7,558	174	157	56	401	....
Clark	14,130	13,875	142	113	79	3,691	1
Fayette	38,178	35,630	1,516	1,032	864	15,613	9
Franklin	16,276	15,598	396	282	219	2,861	1
Gallatin	4,394	4,258	59	77	29	241	....
Garrard	10,581	10,552	7	22	8	1,914	....
Grant	10,168	10,003	87	78	25	242	....
Harrison	14,483	14,178	179	126	80	1,234	1
Henry	11,898	11,724	59	115	25	1,488	....
Jessamine	9,887	9,756	78	53	41	2,276	1
Kenton	66,567	49,889	10,360	6,318	3,555	3,325	6
Madison	21,319	21,146	79	94	54	4,910	1
Mason	15,045	13,793	786	466	162	2,550	3
Mercer	12,933	12,837	46	50	32	1,830	....
Montgomery	9,686	9,522	90	74	42	2,517	....
Nicholas	9,154	9,001	108	45	31	709	....
Owen	11,727	11,668	29	30	16	811	....
Pendleton	11,452	10,761	369	322	103	164	....
Robertson	3,818	3,802	7	9	1	52	....
Scott	12,197	11,941	145	111	62	3,059	....
Shelby	15,188	14,914	119	155	78	3,266	....
Spencer	7,104	7,068	17	19	8	673	....
Washington	13,028	12,923	59	46	28	1,717	....
Woodford	8,696	8,504	101	91	55	3,033	....
Totals	466,178	422,602	26,659	16,917	9,893	69,001	27

(Data from U. S. Census.)

of sustenance with present agricultural practice. In the cities, however, an increase in the percentage of foreign born may be expected, especially in the major industrial centers.

Negroes have always constituted an appreciable fraction of the population, particularly in the Inner Blue Grass, as the large farms and the agricultural economy of this sub-region both afforded the opportunity for profitable employment of slave labor. As early as 1790, there were 11,830 slaves in Kentucky, mostly in the Blue Grass. By 1810, the number in the Blue Grass had increased to 50,720, by 1840 to 85,788, and by 1860, to 91,831. The number of slaves was very unevenly divided among the sub-regions during this period as is shown in the accompanying tabulation.

NUMBER OF SLAVES IN THE BLUE GRASS—1810-1860
By Sub-Regions.

	1810	1840	1860
Typical Inner Blue Grass Cos.			
Fayette	7,664(31.1)	10,710(48.1)	10,015(44.3)
Jessamine	2,483(29.6)	3,472(36.9)	3,698(39.0)
Woodford	3,414(35.3)	5,752(48.9)	5,829(51.9)
Typical Outer Blue Grass Cos.			
Henry	1,137(16.7)	2,349(23.4)	3,311(27.7)
Madison	3,037(19.5)	5,413(33.0)	6,034(35.0)
Shelby	3,114(20.9)	6,355(35.7)	6,634(40.3)
Typical Eden Shale Belt Cos.			
Grant	.....	348(8.3)	696(8.3)
Owen	.....	1,281(15.5)	424(3.3)
Pendleton	386(12.6)	437(9.8)	.....

Numbers in parenthesis indicate percentage of the total population.
(Data from U. S. Census.)

In both the Inner and Outer Blue Grass, there were many slaves and the number increased steadily up to 1860, but in the Eden Shale Belt, conditions made slavery unprofitable, hence few slaves were owned and negroes constituted a much smaller, as well as a declining fraction of the population, as contrasted with conditions in the other two sub-regions.

The total number of negroes has decreased steadily since 1860, this decrease in number being very marked between 1910

and 1920, the loss during that period being 9,675 or 12.1% of the total negro population in 1910. In 1910, negroes constituted 14.5% of the total population of the Blue Grass, in 1920, only 12.5%. This loss of negro population occurred in all Blue Grass counties except Fayette, Campbell and Kenton, where there were slight gains in the total negro population, though losses in the percentage of negroes in the total population. A similar decrease in negro population has occurred for the state as a whole and for most portions of the state during this decade, the percentage for the state as a whole decreasing from 11.4% in 1910 to 9.8% in 1920. Losses for typical counties for each sub-region of the Blue Grass are shown in the accompanying tabulation.

NUMBER OF NEGROES IN TYPICAL BLUE GRASS COUNTIES—1910 AND 1920

	1920	1910
Typical Inner Blue Grass Counties		
Fayette	15,613(28.6)	14,879(31.2)
Jessamine	2,276(18.6)	2,962(23.5)
Woodford	3,033(25.7)	3,724(29.6)
Typical Outer Blue Grass Counties		
Henry	1,488(11.1)	1,792(13.1)
Madison	4,910(18.7)	5,698(21.1)
Shelby	3,266(17.6)	3,991(22.1)
Typical Eden Shale Belt Counties		
Grant	242(2.3)	292(2.8)
Owen	811(6.5)	943(6.6)
Pendleton	164(1.4)	261(2.2)

Numbers in parenthesis indicate percentage of total population.
(Data from U. S. Census.)

The decrease of negro population is attributable to the migration of negroes from Kentucky to industrial centers in the northern states, and to the fact that the negro does not fit into the present farm economy of many parts of the Blue Grass. Only in the counties of larger land holdings and an extensively developed tenant system are there large numbers of negroes on the farms. The subdivision of farms which is occurring with such rapidity is greatly decreasing the opportunity for the profitable employment of negro labor in agriculture.

In the larger cities, as Lexington and Covington-Newport, negroes have increased somewhat in numbers, though even there industrialization has not progressed sufficiently to afford employment to any considerable amount of unskilled negro labor. As a component of the population, the negro is at present of declining importance and promises to become even less important in the rural districts. In the cities, there will probably always be an appreciable number of negroes in domestic service and employed as casual labor or in industry.

Wealth

Although only 17.9% of the area of the state, the Blue Grass contains 32.5% of the state's total taxable wealth, with an average valuation of $80,259 per square mile as contrasted with a state average of $44,134. (3) The counties with large urban centers: Fayette, Kenton, and Campbell, head the list of Blue Grass counties as regards total taxable wealth and taxable wealth per square mile of land surface, but the better agricultural areas, including Fayette County, rank first in taxable wealth per capita.

Among the sub-regions, the Inner Blue Grass ranks high in both total taxable wealth and taxable wealth per capita. The same is true in slightly lesser degree for the Outer Blue Grass. The small valuation per square mile and the small taxable wealth per capita in Owen and Pendleton counties re-emphasize the relative undesirability of the Eden Shale Belt by comparison with the balance of the Blue Grass.

Low valuations in a given county represent agricultural undesirability and the absence of any considerable urban aggregation, as in Anderson County; high valuations in a given county may represent either urban wealth, as in Campbell County; agricultural prosperity, as in Bourbon County; or a combination of both, as in Fayette County.

Present valuations probably represent with a considerable degree of accuracy not only existing conditions, but the relative future possibilities of the different counties as well. This is an old settled area, with agriculture highly developed and with few possibilities, aside from industrialization, which have not been realized. The future, therefore, will probably witness few

changes in the relative importance of the various counties of the Blue Grass as determined by per capita wealth and by taxable

TAXABLE WEALTH

Counties	Total Taxable Wealth	Taxable Wealth Per Sq. Mile	Taxable Wealth Per Capita
Bourbon	$33,608,712	$110,555	$1,055
Woodford	21,207,939	108,758	1,035
Fayette	81,841,746	304,244	881
Clark	26,715,966	100,815	830
Shelby	25,825,602	60,481	765
Mason	24,755,213	109,053	754
Boyle	19,576,796	105,251	733
Scott	19,987,697	69,161	726
Boone	13,097,990	51,784	705
Jessamine	14,999,835	87,208	678
Harrison	20,014,865	64,356	669
Montgomery	14,570,157	73,586	664
Garrard	14,766,066	62,304	639
Mercer	16,274,006	64,324	586
Nicholas	11,032,751	53,042	579
Madison	25,794,390	57,835	541
Spencer	8,053,490	43,298	540
Henry	12,592,839	41,560	497
Franklin	17,640,661	88,646	490
Grant	9,392,405	35,577	455
Bracken	8,676,227	42,530	433
Carroll	6,775,493	51,329	417
Pendleton	9,583,422	34,348	413
Washington	10,559,626	35,316	379
Robertson	2,718,891	24,493	353
Kenton	48,243,223	295,357	344
Owen	8,330,294	22,698	343
Campbell	40,506,689	279,356	340
Gallatin	3,068,242	28,149	338
Anderson	7,494,551	37,286	305
Total	$577,705,784		
Ave. for the Blue Grass		$80,259	$571

Based on the Third Annual Report of the Kentucky State Tax Commission, 1920.

wealth per square mile of land surface, though these differences may be accentuated.

This is one of the wealthy sections of Kentucky. Only nine of the thirty counties fall below the state average of taxable wealth per square mile and none falls to the average of $17,104 for eastern Kentucky. This is a condition which may be expected to persist, though it is probable that the gap between the state average and the average for the Blue Grass will become less as development in other portions of Kentucky raises the state average.

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CONCLUSION.

The outstanding characteristic of the Blue Grass Region is its essentially rural character. In this area, the increase of urban population has been very slow and has been confined to limited areas, largely on the northern margin. Natural increases in population have been absorbed in part in agriculture by modification of the agricultural economy of the area in the direction of smaller farming units and a larger percentage of crops requiring intensive cultivation, and in part by a movement of population into urban districts in other portions of the country. This maintainance of essentially rural conditions cannot be explained on the basis of the physical setting alone, certainly not by physical isolation. The explanation appears to lie to a considerable degree in the preference of the population.

The Blue Grass was one of the first sections of Kentucky to be occupied agriculturally. It has been the center upon which the life of the state has focussed since the period of earliest settlement west of the Appalachians. Even today, in spite of the changing economic emphasis in the state, and the consequent decreasing relative importance of the area, the Blue Grass is in fact as well as in popular fancy, the "Heart of Kentucky."

The earliest movement of population into the area was principally by overland routes of which the "Wilderness Road" was the most important; later, the major movement was by way of the Ohio River to Maysville and thence overland to the interior. Despite the great difficulty and danger attendant on the journey, the combined attraction of genial climate and fertile soil led thousands to brave the necessary hardships and dangers to take advantage of the opportunities afforded by this garden spot of North America. By 1810, the total population of the Blue Grass was 216,863 and the average density per square mile was 30.1; by 1850, the density of population had increased to 47.1 to the square mile.

Even during the early period, the relatively greater agricultural desirability of the Inner and Outer Blue Grass as con-

trasted to the Eden Shale Belt was recognized, as is shown by the greater density of population in the first two sub-regions. By 1850, the initial difference in density of population had disappeared to a considerable extent as a result of the prior occupation of the land of the more desirable areas, which forced expansion into the tracts of lesser desirability. With increasing and prolonged use of these poorer areas, the early difference in dsirability has become accentuated and this has been reflected by an increase in population in both the Inner and Outer Blue Grass and a decline in population in the Eden Shale Belt.

The early occupation of the area by a population of similar racial stock and the subsequent genetic increase in an area of essential economic unity have developed conditions which cannot be duplicated elsewhere in the state. In an optimum physical setting in the Blue Grass, rural life, surfically at least, lacks the sordidness so often present in country districts. To idealistic descriptions of these best portions of the Blue Grass is due the prevalent though erroneous impression of uniformly good conditions throughout the area.

The major assets of the area are its agricultural possibilities, its timber resource, and its mineral wealth in order of decreasing importance. In addition, accessibility to markets and to raw materials for manufacture may lead to industrial development. In the utilization of the assets, various problems have already arisen which have been given separate consideration previously, but which may be summarized briefly at this point in order to unify the previous discussion of the problems and the suggested solutions.

Agricultural use of the land has already extended too far; practically all of the unimproved land is in farms and nearly all of the farm land is or has been improved. No permanent expansion of the agricultural area in the Blue Grass can be expected, rather a decrease is probable. This decrease has been and will be negligible in both the Inner and Outer Blue Grass, but will be serious in the Eden Shale Belt where losses have already begun and where they will increase rapidly. This loss of land from agricultural use is reflected in the decrease in number and increase in the size of farms, accompanied by

a loss of population. In the Inner and Outer Blue Grass, none of these phenomena are present.

The original forest, which was largely destroyed in clearing the land for agricultural use, was a hardwood forest of varied and valuable stand. At present, no part of the Blue Grass is a commercial producer of lumber, though the pastures of the Inner Blue Grass are often almost grove like in character and scattered remnants of the forest still persist. In addition, much land, particularly in the Eden Shale Belt, is reverting to timber with its abandonment after ruin by erosion. The timber asset is, however, at present only a potentiality.

Commercially important mineral wealth is limited to a few small deposits of non-metallic minerals of rather limited distribution. Such deposits have virtually no effect upon the present economy of the area and show no considerable future promise.

A survey of existing conditions and a consideration of possibilities for the future force the conclusion, that in the future as in the past, the prosperity of this area is in major part dependent upon the use of the land. A wise use will insure to the area a continuance of its present importance in the state; unwise cropping practice must lead to a loss of that position.

The problems of agricultural practice and use of the land in grazing and forestry differ with the sub-regions as a result of rather fundamental differences in topography and important variations in soils and accessibility to urban markets.

It is not probable that either the Inner or Outer Blue Grass will ever again be important in the production of hardwood lumber. The hardwood lands of these sub-regions, in common with other former hardwood producing areas such as Ohio, Indiana and Illinois, once cleared of timber, remain in agricultural use. High grade land with fertile soils and favorable climate and topography, can never be counted on as a source of any considerable permanent supply of lumber. In the Eden Shale Belt, however, conditions are far different. Slope are often steep and soils are thin and wash badly, but trees do well on these steep well drained slopes. Rainfall is abundant and well dis-

tributed; the growing season is long so that certain valuable species, such as yellow poplar and walnut, find an ideal habitat. As prices continue to advance with failing supply, silviculture may be expected to yield better returns on these slopes than can be secured by crops of corn. In the Eden Shale Belt, it is doubtful whether 25% of the land can be cropped permanently and profitably. Certainly a large fraction, probably between 25% and 35%, would yield better returns under forestry than it does under present use, as much of the land is idle and brings in no return except as it furnishes scanty pasturage. Timbered slopes would be both more pleasing to the eye and more profitable than the run down, washed and abandoned fields of much of the Eden Shale Belt.

The question of soil erosion and slope wash is acute only in the Eden Shale Belt, but the effects are felt elsewhere in the blocking of streams for navigation, the silting up of reservoirs of the hydroelectric developments, and in the increased flood danger resulting from unregulated stream flow.

The productivity of the Eden Shale Belt is decreasing and the considerable fraction of non-productive area is increasing. Reforestation of the steeper slopes is indicated as a solution of the difficulty. The pursuance of a policy of taxation which will render timber production profitable should do much to insure that such lands will be put to their best use. In view of the nation-wide shortage of an adequate supply of hardwood lumber and the declining agricultural performance of much of the Eden Shale Belt, the state can well afford to formulate a progressive program which will encourage the reforestation of this and similar hilly areas in the state. Such a program will mean an eventual gain in revenue by the state and will prevent the ruin of a large fraction of the land in the Eden Shale Belt.

In the Inner and Outer Blue Grass, no marked alteration in the agricultural economy may be expected. Aside from minor adjustments which are necessary, based on size of farm, topography, soil fertility, and accessibility to market, the general type of farm practice best suited to Blue Grass conditions is a combination of live stock and tobacco. This combines in a given farm both intensive and extensive types of agriculture. Blue Grass is adapted to the soils, furnishes excellent pasturage for

cattle, prevents soil erosion and preserves soil fertility, especially in association with a live stock industry. These Blue Grass sod lands raise maximum crops of high quality tobacco; the intensive crop, tobacco, enables the farmer to secure large returns.

In special areas, well located with reference to urban centers, dairying with the emphasis on the production of milk, is more profitable than a combination of grazing and tobacco production.

In the farming practice, diversification is an important factor in success, as it enables a better distribution of labor throughout the year, tends to preserve soil fertility by enabling better crop rotations, and makes the farm income more stable and regular. Diversification should be of such a character that it saves time, labor, and money. A variety of enterprises, merely for the sake of diversity, is without value. No fundamental changes in the character of the agriculture may be expected in the Inner and Outer Blue Grass, only modification of existing practice, as the permanency of agriculture under present practices is not threatened.

In the Eden Shale Belt, no marked increase in urban population may be expected. The towns serve rather limited areas which may be increased somewhat in extent with the improvement of roads, but losses of tillable area may be expected to offset areal increases in the trade territory. In the Outer Blue Grass as well, no marked advantage as to location and character of tributary area indicate a considerable future urban development.

In the Inner Blue Grass, and on the northern margin, occur the most favorable conditions for the development of urban aggregations in the future. These are also the areas of present major urban development. The Covington-Newport center, with a present population of over 110,000, should have a considerable future of expansion before it. In the Inner Blue Grass, Lexington and Winchester will also doubtless witness growth and some industrial development.

The traditions of the area are agricultural; major changes can be expected only as a result of an infusion of new blood or the establishment of contacts with other areas which will result in the development of new viewpoints. On the northern margin,

where such contacts exist and where the population is more diverse in character, industrialization has made considerable progress. Indications are that a similar change is in store for the major population centers of the Blue Grass proper.

No startling conclusions have been drawn as to the future of the Blue Grass area as it is not believed that conditions will alter radically. In the area as a whole, the topography, soils and climate indicate the permanency of agriculture, supplemented by grazing and forestry, as the major basis for regional prosperity in the future as in the past. Necessary minor modifications have been recommended, but no radical changes seem to be indicated. The area has been one of great prosperity and the future appears of equally great promise.

The present population is essentially of American stock and the characteristics which are popularly associated with the Blue Grass and its inhabitants are well founded in fact, traditionally somewhat exaggerated, but fundamentally correct. Without doubt, the Inner Blue Grass, with Lexington, a city of fine homes as its unofficial capital, is one of the most beautiful agricultural areas in the United States; probably no other area surpasses it in charm.

It is probable that the Blue Grass will command permanently a high rank among the geographical regions of Kentucky. Its lead will be challenged and its relative position may be altered, but this will result through development in other areas, which should be an aid to progress in the Blue Grass region.

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